Appendix P

Forest Service Biological Evaluation

US Forest Service Biological Evaluation

for the

Land Use Plan Amendment and Final Environmental Impact Statement for the Conservation of Greater Sage-Grouse in Utah, including the Ashley, Fishlake, Manti-La Sal, Dixie, and Uinta-Wasatch-Cache National Forest Plans

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ACRONYMS

AMP	allotment management plan
ANF	Ashley National Forest
AUM	animal unit month
BI	beneficial impact
BLM	Bureau of Land Management
BMP	best management practices
BSU	biologically significant unit
COT	Conservation Objectives Team
CSU	controlled surface use
DNF	Dixie National Forest
EIS	environmental impact statement
FNF	Fishlake National Forest
FSM	Forest Service Manual
GHMA	general habitat management area
GIS	geographic information system
GRSG	Greater Sage-Grouse
MIIH	may impact individuals or habitat
MLNF	Manti-La Sal National Forest
NSO	no surface occupancy
NTT	National Technical Team
ORV	off-road vehicle
PHMA	priority habitat management area
SAS	sagebrush associated species
SFA	sagebrush focal areas
SGMA	sage-grouse management area
UDWR	Utah Division of Wildlife
UNF	Uinta National Forest
USDA	United States Department of Agriculture
USFWS	US Fish and Wildlife Service
WCNF	Wasatch-Cache National Forest

1. INTRODUCTION

The purpose of this report is to identify the likely impacts of the Greater Sage-Grouse (GRSG) Planning Decision specifically for the Ashley, Fishlake and Manti-La Sal, Dixie, and Uinta-Wasatch-Cache National Forests on US Department of Agriculture (USDA), Forest Service Region 4 sensitive species.

Sensitive species for Region 4 are listed on the Regional Forester's sensitive species list, which is composed of plants, birds, mammals, amphibians, and fish. Species listed as threatened or endangered by the US Fish and Wildlife Service (USFWS) are addressed in the biological assessment prepared for this project.

This biological evaluation addresses sensitive species that meet the following criteria:

- Species that are known to occur on any of the National Forest System lands listed above, based on confirmed sightings
- Species that may occur on any of the National Forest System lands listed above, based on reliable unconfirmed sightings
- Species that may occur on any of the National Forest System lands listed above, based on the presence of potential habitat

Forest Service Policy—The USDA Forest Service has developed a policy regarding the designation of plant and animal species (Forest Service Manual [FSM] 2670; Supplement 2600-94-2). The Regional Forester's sensitive species list contains taxa only when they meet one or more of the following criteria:

- The species is declining in numbers or occurrences and evidence indicates it could be proposed for federal listing as threatened or endangered if action is not taken to reverse or stop the downward trend.
- The species' habitat is declining and continued loss could result in population declines that lead to federal listing as threatened or endangered if action is not taken to reverse or stop the decline.
- The species' population or habitat is stable but limited.

Forest Service Objectives—Under FSM 2672.41, the objectives for completing biological evaluations for proposed Forest Service programs or activities are as follows:

- To ensure that Forest Service actions do not contribute to loss of viability of any native or desired nonnative plant or contribute to animal species or trends toward the USFWS listing any species the Forest Service Region 2 lists as sensitive
- To comply with the requirements of the Endangered Species Act, actions of federal agencies should not jeopardize or adversely modify critical habitat of federally listed species
- To provide a process and standard by which to ensure that threatened, endangered, proposed, and sensitive species receive full consideration in the decision-making process, and to enhance opportunities for mitigation

FSM 2670.22 #2, regarding objectives for sensitive species, states, "Maintain viable populations of all native and desired nonnative wildlife, fish, and plant species in habitats distributed throughout their geographic range on National Forest System Lands." FSM 2600, Section 2671.44 (Supplement 2600-94-2), provides direction on the review of actions and programs authorized, funded, or implemented by the Forest Service, relative to the requirements of the Endangered Species Act.

2. PROJECT HISTORY

GRSG have emerged as a significant conservation concern over the last 10 years. The species has been proposed for listing under the Endangered Species Act as "warranted, but precluded due to higher priorities" because of two primary factors: the large-scale loss and fragmentation of habitats across the species range and a lack of regulatory mechanisms in place to ensure the conservation of the species. The primary threats to GRSG habitat, as summarized in the listing decision, are energy development infrastructure in the eastern portion of the species' range and sagebrush communities converted to annual grasslands by uncharacteristically large wildfires in the western portion of the species range (USFWS 2010).

The Bureau of Land Management (BLM) manages approximately half of the GRSG habitats, whereas the Forest Service manages approximately 8 percent, most of which is on national forests in the Intermountain Region. The Forest Service manages approximately 9 million acres of sagebrush habitats, with about 7.5 million acres in the Intermountain Region. Most habitats on Forest Service-administered lands contribute to summer brood-rearing habitats, and some forests and grasslands contribute important breeding and nesting habitat. In the five National Forests in Utah involved with this process, there are 845,508 acres of GRSG habitat, 91 percent of which is mapped as priority habitat and 9 percent as general habitat.

In 2011 and 2012, the USFWS submitted letters to the BLM and Forest Service recommending that the agencies amend their land use plans to provide adequate regulatory mechanisms to conserve the species. Originally, this recommendation identified 10 National Forests, viewed as "high priority," to ensure appropriate regulatory mechanisms. Following scoping and discussions, the Forest Service added an additional 10 forest plans that would be considered for amendment. The Forest Service is participating in several joint environmental impact statements (EISs) with the BLM to develop records of decision that will be used as a basis for amending land use plans, including all Forest plans in Utah.

Since half of all GRSG habitat is on BLM-administered lands, the BLM is taking the lead on amending or revising land use plans, with the Forest Service as a cooperating agency. The purpose is to guide land management plans that conserve and protect GRSG habitat and to assure the USFWS that adequate regulatory mechanisms are in place to ensure the conservation of the species.

Adequate regulatory mechanisms are those conservation measures that can be clearly implemented and are demonstrated to be effective in conserving the species.

EISs will be completed for seven GRSG planning subregions: eastern Montana and portions of North and South Dakota; Idaho and southwest Montana; Oregon; Wyoming; northwest Colorado; Utah; and Nevada and northern California. The Forest Service is participating in six of these EISs (excluding Eastern Montana/Dakotas and some of the areas in Wyoming). The EISs will include joint agency signatures, but separate Records of Decision.
(http://fsweb.r4.fs.fed.us/unit/nr/sagegrouse/index.shtml, Accessed April 16, 2013)

This Biological Evaluation is being prepared in relation to the Utah EIS. The Forest Service is planning to amend all land and resource management plans for the GRSG in Utah.

3. PURPOSE AND NEED

The purpose of the land and resource management plan amendment for the GRSG is to identify and incorporate adequate regulatory mechanisms to conserve, enhance, or restore GRSG habitat by reducing, eliminating, or minimizing threats to its habitat. The need to create this amendment arose when the inadequacy of regulatory mechanisms was identified as a significant threat in the USFWS finding on the petition to list the GRSG. The USFWS identified conservation measures in Forest Service land and resource management plans (as well as BLM Land Use Plans) as the principal regulatory mechanisms for habitat conservation. Therefore, the National Forests in Utah land and resource management plan amendments will focus on areas affected by threats to GRSG habitat identified by the USFWS in the March 2010 listing decision (USFWS 2010).

4. DESCRIPTION OF THE ALTERNATIVES

There are five alternatives to consider under this analysis, the No Action Alternative and four action alternatives: Alternative A—No Action, Alternative B, Alternative C, Alternative D, and Alternative E. A brief description of each is provided below. For a full description of the alternatives, as well as project design criteria, mitigation, and monitoring requirements, please refer to Chapter 2 of the EIS prepared for this project.

One of the key differences between the alternatives is which type of designated habitat each applies to. Designated grouse habitat is divided into two main categories—preliminary priority habitat management area (PHMA) and preliminary general habitat management area (GHMA). PHMA is defined as areas with the highest conservation value to maintaining sustainable GRSG populations. These are breeding, late brood-rearing, and winter concentration areas. GHMA is defined as areas of occupied seasonal or year-round habitat outside of PHMA. There is also a third category, called linkage areas. In the document, “all occupied habitat” refers to all PHMA, GHMA, and linkage areas.

4.1 ALTERNATIVE A: NO ACTION

Under the No Action Alternative the Forest land and resource management plans would not be amended. The existing management direction set forth in the plans for GRSG and sagebrush habitats would continue.

4.2 ALTERNATIVE B

All applicable and appropriate conservation measures that were developed in the National Technical Team’s (NTT) report (NTT 2011) are considered and incorporated into this alternative. These conservation measures would apply only to PHMA, and there would be a 3 percent cap on disturbance in these areas. Additional details about this alternative in PHMA are as follows:

- Travel construction would be limited.
- Minimum standards would be applied.
- There would be no road upgrades.
- Recreation special use permits would be allowed only if they were deemed to have a beneficial impact on GRSG.

- Rights-of-way (ROWs) would be excluded.
- The Forest Service would aim to keep PHMA and to acquire more.
- Grazing direction would be adjusted to improve management for GRSG.
- PHMA would be closed to new fluid minerals leases, and existing leases would have a 4-mile no surface occupancy (NSO) buffer around leks.
- Wildfire and fuels would be managed to protect sagebrush habitats.
- Habitat restoration would be a priority, with a focus on native species.

4.3 ALTERNATIVE C

During scoping, conservation group members submitted suggestions on how to define PHMA and GHMA and were given the opportunity to develop their own conservation measures that would be applied to those areas (proposing more stringent management). All of the reasonable conservation measures across the GRSG range have been consolidated into one alternative; each sub-region will be analyzed in detail.

Alternative C would apply to all designated PHMA, GHMA and linkage areas. There would be a 3 percent cap on disturbance in these areas, and PHMA would be closed to livestock grazing. Additional details about this alternative are as follow:

- Travel construction would be limited in all designated habitat.
- No new roads would be constructed within 4 miles of a lek or occupied habitat.
- Recreation would seasonally prohibit camping and nonmotorized recreation within 4 miles of a lek.
- All designated habitat would be exclusion areas for ROWs and special use permits.
- The Forest Service would aim to keep all designated habitat and would acquire more.
- Wind and solar installations would not be allowed to be sited in designated habitat.
- All designated habitat would be closed to new fluid minerals leases; existing leases would have a 4-mile NSO buffer around leks.
- Wildfire and fuels would be managed to protect and restore sagebrush habitats; areas would be closed to grazing after wildfire.
- All PHMA would be designated as areas of critical environmental concern (ACEC) or as zoological areas.

4.4 ALTERNATIVE D

In this alternative, the Utah sub-region has modified the recommendations from the NTT report and adjusted habitat boundaries based on science, resource trade-offs, scoping comments, and internal staff expertise. This alternative is very similar to the Alternative B. It would be applied to sagebrush ecological sites in PHMA, and there would be a 5 percent cap on disturbance in these areas. Additional details about this alternative are as follows:

- Travel construction would be limited in PHMA, with a disturbance exception allowing the Forests to exceed the 5 percent cap if GRSG populations are doing well
- Recreation special use permits that do not adversely affect the GRSG would be allowed.

- ROWs would be excluded in PHMA, with the exception of transmission lines.
- Grazing direction would be adjusted to improvement management for GRSG in PHMA and other parts of all designated habitat.
- PHMA would be designated as a NSO for new fluid minerals leases; existing leases would have seasonal conditional surface use.
- Wildfire and fuels would be managed to protect sagebrush habitats in all designated habitat.
- Habitat restoration would be a priority, with a focus on native species.

4.5 ALTERNATIVE E

As explained in Chapter 1 of the EIS, the planning area includes all occupied GRSG habitat in Utah (except GRSG habitat on portions of the Sawtooth National Forest that fall within Utah) as well as lands administered by the Ashley National Forest in Wyoming. Because portions of two states fall within the planning area, Alternative E is divided into two alternatives, Alternative E-1 for Utah and Alternative E-2 for that portion of the planning area that falls within Wyoming.

Alternative E-1 is based on the State of Utah's Conservation Plan for Greater Sage-Grouse in Utah; it would apply to all BLM- and Forest Service-administered lands in that state. Alternative E-2 is based on the State of Wyoming's Governor's Executive Order 2011-5, with adjustments by the BLM Interdisciplinary Team, which includes members of the Wyoming Governor's Office.

4.6 THE PROPOSED PLAN

The Proposed Plan was developed as a result of public comments, best science, cooperating agency coordination, and internal review of the Draft Land Use Plan Amendment/EIS. It consists of a combination of various management actions from all the draft alternatives. This alternative includes a 3 percent disturbance cap that would be calculated at two levels. Project level disturbance would be calculated using a density disturbance calculation tool (see Appendix E, FEIS) that is similar to the tool being used in Wyoming. Disturbance would be calculated at both the biologically significant unit (BSU) level and project levels. In Utah, the BSU is synonymous with the PHMA boundary in each population area (in other words, the BSU in the Carbon Population Area is the same as PHMA in the Carbon Population Area). This multistep approach is not considered under the other alternatives in the Draft EIS.

The Proposed Plan includes more specific vegetation objectives, which are included in vegetation objectives tables. These objectives are based on the ecology of GRSG population areas in the planning area. These objectives (Connelly et al. 2004) were used with additional adjustments made, based on local nesting and brood-rearing data that have been collected in conjunction with research projects in Utah. Alternatives proposed under the Draft EIS had included a more generalized objective for desired cover percentages and heights for sagebrush, grasses, and forbs in seasonal habitats. In addition, this alternative includes quantifiable treatment objectives. The acre amount proposed for treatment is equal to the number of acres that the Vegetation Dynamics Development Tool model indicates are necessary to maintain a minimum of 70 percent of land capable of producing sagebrush, with 10 to 30 percent sagebrush canopy cover. Research indicates that when 50 to 70 percent of the landscape includes sagebrush, the likelihood of GRSG persistence increases (Aldridge et al. 2008; Wisdom et al. 2011).

This alternative also includes some lands that have been identified as sagebrush focal areas (SFA). SFA have been determined to be highly important landscapes across the GRSG range. More restrictive management has been placed on lands in SFA to emphasize GRSG protection. SFA include approximately 228,500 acres surface estate and 4,900 acres of split-estate federal minerals in the Box Elder and Rich population areas. It also specifies that lek buffers that will be applied to PHMA and GHMA be consistent with the lek buffer distances identified in the US Geological Survey Report: Conservation Buffer Distance Estimates for Greater Sage-Grouse—A Review (Open File Report 2014-1239), in accordance with the Buffer Appendix in the FEIS.

Similar to Alternatives B and D, an adaptive management plan is proposed that identifies soft and hard triggers and a management approach for responding to those triggers. If a hard trigger is met, immediate action would be necessary to stop a severe deviation from GRSG conservation objectives. If a soft trigger is met, the specific causes that are contributing to the decline would be analyzed. If Forest Service management actions are determined to be the cause or to be contributing to the decline, the Forest Service would apply measures within its implementation-level discretion to mitigate the decline of populations and habitat.

Additional details about this alternative are the following:

- Travel construction would be limited in PHMA, GHMA, and SFA.
- Temporary recreation special use permits in PHMA would be allowed only if they are deemed to have a net conservation gain to the GRSG.
- ROWs would be avoided in PHMA; major ROWs would be excluded within 4 miles of leks, and minor ROWs would be excluded within 1 mile of leks.
- The Forest Service would keep PHMA and GHMA and would acquire more.
- Grazing direction would be adjusted to improve management for GRSG.
- New fluid minerals leases would have no surface occupation stipulations in PHMA.
- In SFA, there would be NSO and no waivers, exceptions, or modifications for fluid mineral leasing.
- Wildfire and fuels would be managed to protect sagebrush habitats in PHMA and GHMA.
- Habitat restoration would be a priority, with a focus on native species.
- Additional protections for the Anthros Mountain Population on the Ashley National Forest (see Sect. 7.1.9).

5. ANALYSIS AREA

The analysis area consists of National Forest system lands in Utah, including the Ashley, Fishlake and Manti-La Sal, Dixie, and Uinta-Wasatch-Cache National Forests, that have been identified as grouse habitat (Figure 1). This consists of 845,508 total acres of identified GRSG habitat, approximately 11 percent of the 7,663,304 acres that comprise all Forest Service-administered lands in Utah. Table 1 shows the acres of occupied GRSG habitat on each Forest unit.

Table 1 GRSG habitat by forest and percent of land cover for the Utah EIS planning area, from GIS analysis

National Forest	Total PHMA (acres)	Percent of Forest
Ashley	224,822	16
Dixie	183,886	11
Fishlake	180,452	11
Manti-La Sal	96,072	12
Uinta-Wasatch-Cache	160,276	7
TOTAL	**845,508**	**(Average 11.4)**

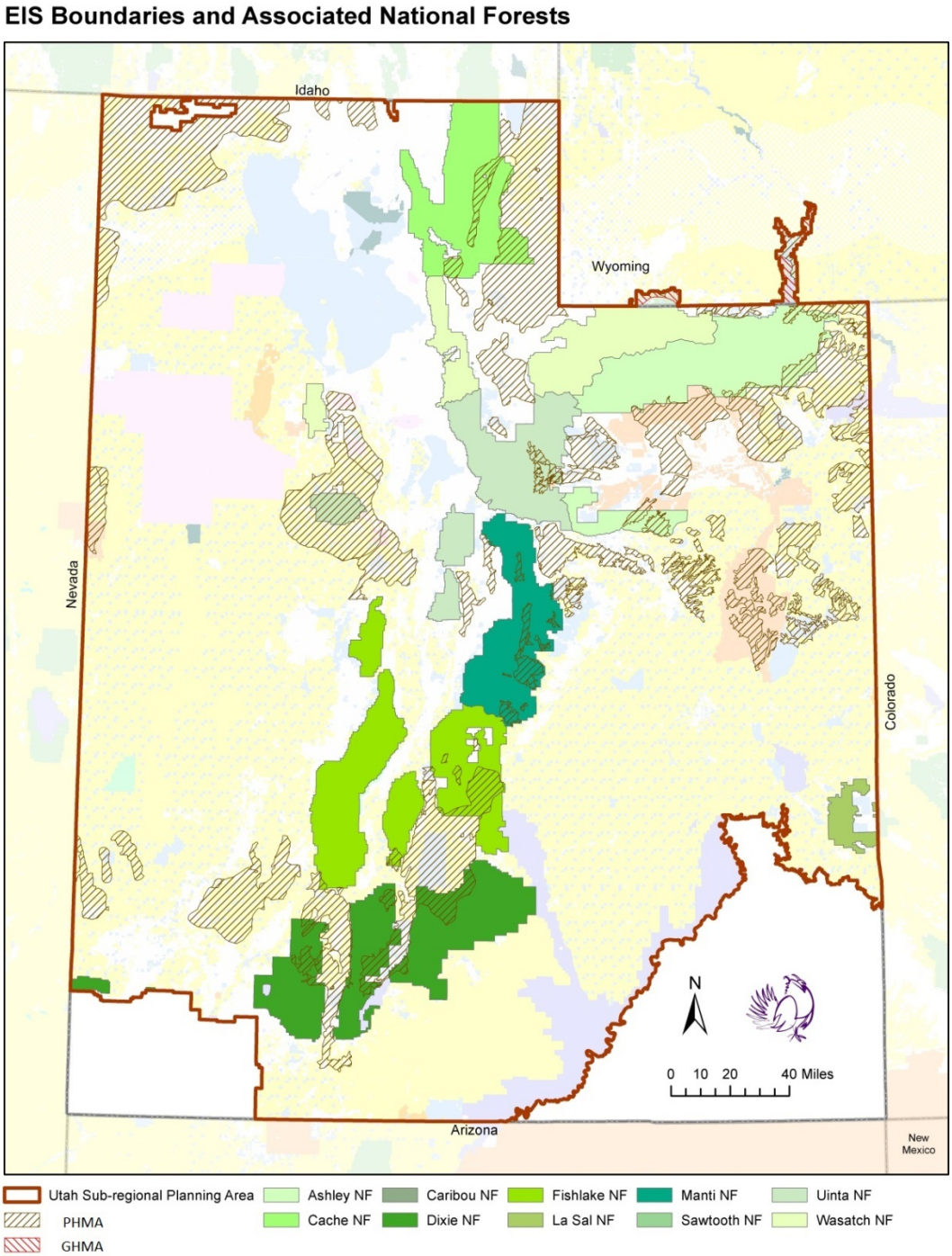

Figure 1 Utah GRSG Planning Area with Forest Service Lands and Proposed PHMA and GHMA

6. SPECIES CONSIDERED IN THE ANALYSIS

The Region 4 sensitive species list (dated February 2013) is composed of plants, birds, mammals, amphibians, and fish identified for that region. The Forest Service conducted a review for Region 4 sensitive species that may occur or be affected by activities associated with the Planning EIS and the Land and Resource Management Plan Forest Amendment for the Greater Sage-Grouse on National Forests in Utah. Existing occurrence information and known or potential habitat was reviewed by searching the Natural Resource Management database. Sources of information in this database are Forest Service records and files, the Utah Natural Heritage Program, Utah Division of Wildlife (UDWR) information, and published research.

Table 2 is a list of USFWS listed, candidate, and proposed species and Forest Service sensitive species known to exist or suspected to exist on Forest Service-administered lands in Utah. (Threatened and endangered species are addressed separately in the biological assessment prepared for this project.) All of the species in Table 2 were considered in this analysis and were compared to the four criteria listed below. These criteria were used to identify species that would experience no impact from implementing the action alternatives and could therefore be eliminated from detailed analysis.

The numerical categories below are referred to as Evaluation Criteria in Table 2:

1. Suitable habitat or elevation range does not exist for these species in the analysis area.

2. The type or intensity of the activity in the proposed action is expected to have no impact/impact on these species or their habitat.

3. Individual animals may be accidental, dispersing, migrating, happenstance, vagrant, nomadic or opportunistic visitors to the habitats impacted by the proposal but have shown no affiliation to or dependence on these habitats.

4. The associated conservation design or mitigations eliminate any potential for impact on the species.

Species carried forward into Table 3 were not excluded from detailed analysis. This is because they are likely to occur in or near the analysis area, or an action could affect potential habitat in or near the analysis area (negatively or positively, directly, indirectly, or cumulatively).

Table 2 USDA Forest Service Region 4 sensitive species occurring or potentially occurring on National Forest System lands, with those that may be influenced by an action alternative to be further analyzed in this document; the others dismissed from discussion

Species	Habitat Description and Range	Known or Suspected to Be in Analysis Area?	Evaluation Criteria	Applicable National Forest1
MAMMALS				
Wolverine *Gulo gulo (luscus)*	Montane habitats in conifer, subalpine, and tundra zones.	N	2,3,4	ANF, WCNF
Pygmy rabbit *Brachylagus idahoensis*	Sage-steppe habitats.	Y	Not excluded (see detailed analysis below)	All
Bighorn sheep *Ovis canadensis*	Open or semi-open terrain, with a mix of steep and gentle slopes, broken cliffs, rock outcrops, and canyons.	Y	2,3	ANF, FNF, MLNF, UNF, WCNF
Spotted bat *Euderma maculatum*	Caves, mines, cliffs, abandoned buildings, and snags.	Y	3,4	All
Townsend's western big-eared bat *Corynorhinus townsendii*	Caves, mines, cliffs, abandoned buildings, and snags.	Y	3,4	All
Fisher *Martes pennanti*	Subalpine and montane coniferous habitats, with suspected historical presence in Utah.	N	1,3	UNF
Gray wolf *Canis lupus*	Variety of habitats but very limited distribution in extreme northeastern Utah.	N	2,3	WCNF

[1]ANF = Ashley National Forest; DNF = Dixie National Forest; FNF = Fishlake National Forest; MLNF = Manti-La Sal National Forest; UNF = Uinta National Forest; WCNF = Wasatch-Cache National Forest

Species	Habitat Description and Range	Known or Suspected to Be in Analysis Area?	Evaluation Criteria	Applicable National Forest1
BIRDS				
Bald eagle *Haliaeetus leucocephalus*	Generally aquatic habitats; prefers fish during nesting and carrion during winter.	Y	2,3	All
Boreal owl *Aegolius funereus*	Mature to late-successional Engelmann spruce and subalpine fir above 9,000 feet.	N	2,3	ANF, WCNF
Flammulated owl *Otus flammeolus*	Forest owl that nests in cavities and caves from 6,000 to 10,000 feet.	N	2,3	All
Great gray owl *Strix nebulosa*	Taiga forest nester, very infrequent winter visitor to Utah.	N	2,3,4,	ANF, WCNF
GRSG *Centrocercus urophasianus*	Sagebrush hills, with forbs and insects for broods below 8,400 feet.	Y	Not excluded (see detailed analysis below)	All
Columbian sharp-tailed grouse *Tympanuchus phasianellus columbianus*	Sagebrush, perennial grasslands, mountain shrub, and riparian deciduous shrub communities.	Y	Not excluded (see detailed analysis below)	WCNF
Northern goshawk *Accipiter gentilis*	Mature forests, large trees on moderate slopes with open understories for nesting.	Y	3,4	All
Peregrine falcon *Falco peregrinus anatum*	Nests on cliffs with a wide view, low disturbance, and abundance of prey.	Y	3,4	All
Three-toed woodpecker *Picoides tridactylus*	Prefers nesting in mid to high elevation mature coniferous forests, especially abundant following wildfires.	Y	3,4	All

Species	Habitat Description and Range	Known or Suspected to Be in Analysis Area?	Evaluation Criteria	Applicable National Forest1
AMPHIBIANS				
Columbia spotted frog *Rana luteiventris*	Isolated springs and seeps in central through northern Utah.	Y	Not excluded (see detailed analysis below)	ANF, MLNF, UNF, WCNF
Boreal toad *Anaxyrus boreas boreas*	Wetlands at elevations from 7,000 to 11,880 feet.	Y	Not excluded (see detailed analysis below)	All
FISH				
Bonneville cutthroat trout *Oncorhynchus clarkii utah*	Native to Bonneville Basin, in both higher and low elevation cool water systems.	Y	3,4	All
Colorado River cutthroat trout *O. c. pleuriticus*	Native to upper Colorado River drainages. Prefers Cold, clean water environments in high elevation streams and lakes.	Y	3,4	All
Southern leatherside chub *Lepidomeda aliciae*	Native to streams and rivers of southeastern Bonneville Basin, especially southern Utah.	Y	3,4	DNF, FNF, MLNF, UNF
Northern leatherside chub *L. copei*	Native to streams and rivers of southeastern Bonneville Basin, especially central and northern Utah.	Y	3,4	WCNF
PLANTS				
Wonderland Alice flower *Aliciella caespitosa*	Cliffs, crevices, rocky slopes, and arroyos of Navajo and Wingate sandstone. Wayne County, Utah.	N	1	DNF, FNF
Chatterley onion *Allium geyeri* var. *chatterleyi*	Pinyon-juniper, mountain brush, ponderosa pine/manzanita; 6,600 to 8,200 feet.	N	1	MLNF
Sweet-flowered rock jasmine	Alpine tundra. La Sal Mountains; 10,000 to 12,000 feet.	N	1	MLNF

Species	Habitat Description and Range	Known or Suspected to Be in Analysis Area?	Evaluation Criteria	Applicable National Forest1
Androsace chamaejasme ssp. *carinata*				
Wheeler's angelica *Angelica wheeleri*	Wet or boggy areas near seeps and springs; 5,000 to 10,000 feet.	Y	1,2	UNF, WCNF
Link Trail columbine *Aquilegia flavescens* var. *rubicunda*	Springs and seeps in the Mesa Verde formation with aspen, ponderosa pine, and spruce-fir; Wasatch Plateau, Utah; 6,900 to 8,500 feet.	N	1	MLNF
Graham columbine *A. grahamii*	Cliffs, ledges, and drip-lines of Weber sandstone; 7,300 to 8,000 feet.	N	1	ANF
Petiolate wormwood *Artemisia campestris* ssp. *borealis* var. *petiolata*	Outcrops of Red Pine shale in mountain mahogany, manzanita, and ponderosa pine.	N	1	ANF
Bicknell milkvetch *Astragalus consobrinus*	Volcanic gravel to barren stony hillsides; Emery, Sevier, and Garfield Counties, Utah.	N	1	FNF, MLNF
Dana milkvetch *A. henrimontanensis*	Cool desert shrub. Wyoming and basin big sagebrush, low elevation black sagebrush, pinyon-juniper, and ponderosa pine; 7,000 to 8,000 feet.	N	1	DNF
Isely's milkvetch *A. iselyi*	Seleniferous and gypsiferous clays with pinyon-juniper and desert shrubs; 4,700 to 6,000 feet.	N	1	MLNF
Navajo Lake milkvetch *A. limnocharis* var. *limnocharis*	Escarpment; bristlecone, limber, and ponderosa pine; Shore of Navajo Lake.	N	1	DNF
Table Cliff milkvetch *A. limnocharis* var. *tabulaeus*	Escarpments of limestone; talus slopes, ridge crests and ridgetops; above 9,000 feet.	N	1	DNF
Guard milkvetch *A. zionis* var. *vigulus*	Chaparral, mountain brush, and pinyon-juniper; 6,300 to 9,500 feet.	N	1	DNF

Species	Habitat Description and Range	Known or Suspected to Be in Analysis Area?	Evaluation Criteria	Applicable National Forest1
Dainty moonwort *Botrychium crenulatum*	Saturated soils, seeps, springs, and streams in spruce forests; 3,000 to 6,000 feet.	N	1	ANF, UNF
Slender moonwort *B. lineare*	Riparian areas and mixed forests; western states, from California to Colorado; Above 9,000 feet.	N	1	ANF, UNF, WCNF
Paradox moonwort *B. paradoxum*	High elevation moist or wet meadows on Aquarius Plateau, Utah; also found in Idaho, Montana, Oregon, and Washington.	N	1	DNF
Aquarius paintbrush *Castilleja aquariensis*	Alpine, sub-alpine meadows, silver sagebrush and high-elevation black sagebrush; 9,600 and 11,200 feet.	Y	Not excluded (see detailed analysis below)	DNF
Tushar paintbrush *C. parvula* var. *parvula*	Alpine and sub-alpine meadows; open escarpments; Tushar Mountains, Utah; 10,000 to 12,100 feet.	N	1	DNF, FNF
Reveal paintbrush *C. p.* var. *revealii*	Escarpments of the Claron formation; gravels and talus; 7,700 to 9,900 feet.	N	1	DNF
Wasatch fitweed *Corydalis caseana* spp. *brachycarpa*	Along streams with montane forest communities; 6,200 to 10,000 feet.	N	1	UNF, WCNF
Creutzfeldt-flower cryptanth *Cryptantha creutzfeldtii*	Shadescale, mat saltbrush, and scattered pinyon-juniper on Mancos shale; 5,200 to 6,500 feet.	N	1	MLNF
Yellow-white cat's-eye *C. ochroleuca*	Open escarpments; gravels, slopes, and talus of bristlecone, limber, and ponderosa pine; also open pinyon-juniper and cushion plant communities; 7,600 to 9,600 feet.	N	1	DNF
Pinnate spring parsley *Cymopterus beckii*	Cliff crevices or sandy canyon bottoms of Navajo sandstone.	N	1	DNF, MLNF

Species	Habitat Description and Range	Known or Suspected to Be in Analysis Area?	Evaluation Criteria	Applicable National Forest1
Cedar Breaks biscuitroot *Cymopterus minimus*	Open escarpments of loams, gravel, or talus, with cushion plants, bristlecone, limber, and ponderosa pine; 7,600 to 10,500 feet.	N	1	DNF
Brownie ladyslipper *Cypripedium fasciculatum*	Duff of shaded coniferous forests, typically lodgepole pine; western states, from California to Colorado; 8,100 to 9,600 feet.	N	1	ANF, WCNF
Lesser yellow lady's slipper *Cypripedium parviflorum*	Shaded, moist soils in forested areas; 4400 to 5,300 feet.	N	1	WCNF
Wasatch shooting star *Dodecatheon utahensis*	Shaded, moist cracks and crevices of rock outcrops or faces; Often in spray of waterfalls.	N	1	WCNF
Abajo Peak draba *Draba abajoensis*	Spruce, fir, or pine forests, sub-alpine meadows; Utah, Arizona, and New Mexico; 6,200 to 12,400 feet.	N	1	MLNF
Wasatch draba *D. brachystylis*	Moist areas on rocky slopes with aspen and fir communities; 5,500 to 9,800 feet.	N	1	UNF, WCNF
Burke's draba *D. burkei*	Talus slopes of sub-alpine fir, northern Utah mountains; 84,00 to 9,700 feet.	N	1	WCNF
Rockcress draba *D. globosa*	Alpine slopes and summits; Idaho, Montana, Utah, and Colorado; above 11,200 feet.	N	1	ANF, UNF, WCNF
Maguire draba *D. maguirei*	Talus slopes and rocky outcrops; 5,400 to 8,700 feet.	N	1	WCNF
Mount Belknap draba *D. ramulosa*	Alpine; calcareous talus, rocks, or gravels; 10,800 to 12,000 feet.	N	1	FNF
Santaquin draba *D. santaquinensis*	Cracks and crevices of limestone or dolomite rock faces or cliffs in Santaquin and American Fork Canyons, Utah.	N	1	UNF

Species	Habitat Description and Range	Known or Suspected to Be in Analysis Area?	Evaluation Criteria	Applicable National Forest1
Creeping draba *D. sobolifera*	Alpine and sub-alpine meadows; open escarpments of volcanic gravel or talus; Tushar Mountains, Utah; 10,000 to 12,000 feet.	N	1	DNF, FNF
Nevada willowherb *Epilobium nevadense*	Pinyon-juniper and mountain brush communities on limestone outcrops.	N	1	FNF
Pine Valley goldenweed *Ericameria crispa*	Tertiary rocks with aspen, mixed conifer, and mountain brush; Pine Valley Mountains, Utah; above 7,500 feet.	N	1	DNF
Carrington daisy *Erigeron carringtonae*	High elevation escarpment ridges of Flagstaff limestone; 10,000 to 11,000 feet.	N	1	MLNF
Cronquist daisy *E. cronquistii*	Cliffs, crevices, and talus of limestone; 5,700 to 9,900 feet.	N	1	WCNF
Garrett's fleabane *E. garrettii*	Moist limestone cliff faces and crevices; 8,850 to 12,500 feet.	N	1	UNF, WCNF
Kachina daisy *E. kachinensis*	Sweeps, hanging gardens, and open slickrock; 5,300 to 8,400 feet.	N	1	MLNF
La Sal daisy *E. mancus*	Alpine and sub-alpine grass/sedge and forb communities; 9,100 to 10,500 feet.	N	1	MLNF
Untermann daisy *E. untermannii*	Open escarpments and sparsely vegetated ridgetops of shale, gravel, siltstone, and occasionally talus, with scattered bristlecone and limber pine, Douglas fir, and pinyon-juniper; 7,000 to 9,400 feet.	Y	1,2	ANF
Widstoe buckwheat *Eriogonum aretioides*	Open escarpments of loams, gravels, and talus with cushion plants, bristlecone, limber, and ponderosa pine; 7,100 to 8,000 feet.	N	1	DNF
Elsinore buckwheat	Igneous outcrops and gravels in shadscale, sagebrush, ponderosa pine, mixed desert shrub, and pinyon-juniper	N	1	FNF

Species	Habitat Description and Range	Known or Suspected to Be in Analysis Area?	Evaluation Criteria	Applicable National Forest1
E. batemanii var. *ostlundii*	communities; 5,500 to 6,500 feet.			
Logan buckwheat *E. loganum*	Rocky outcrops and sagebrush/bunchgrass communities; 4,800 to 7,800 feet.	Y	Not excluded (see detailed analysis below)	WCNF
Canyon sweetvetch *Hedysarum occidentale* var. *acnone*	Open slopes in pinyon-juniper, mountain brush, and sagebrush; 5,000 to 8,000 feet.	Y	1,2	MLNF
Jones goldenaster *Heterotheca jonesii*	Crevices and sands of Navajo sandstone; 7,500 to 9,500 feet.	N	1	DNF
Utah ivesia *Ivesia utahensis*	Dry rocky hillsides; 7,000 to 11,000.	N	1	UNF, WCNF
Wasatch jamesia *Jamesia americana* var. *macrocalyx*	Cliffs and rocky places with mountain brush and spruce-fir.	N	1	UNF, WCNF
Zion jamesia *J. a.* var. *zionis*	Hanging gardens and ledges of Navajo sandstone; 3,900 to 6,600 feet.	N	1	DNF
Wasatch pepperweed *Lepidium montanum* var. *alpinum*	Rocky, damp crevices at high elevations with mountain brush and spruce-fir; 6,600 to 10,000 feet.	N	1	UNF, WCNF
Neeses' pepperweed *Lepidium montanum* var. *neeseae*	Escarpments of sandstone with scattered pinyon-juniper, manzanita, and ponderosa pine; 6,400 to 9,500 feet.	N	1	DNF
Garrett baldderpod *Lesquerella garrettii*	Talus and outcrops of limestone in alpine tundra, sub-alpine meadow, and coniferous forests; 9,000 to 12,000 feet.	N	1	UNF, WCNF

Species	Habitat Description and Range	Known or Suspected to Be in Analysis Area?	Evaluation Criteria	Applicable National Forest1
Canyonlands lomatium *Lomatium latilobum*	Entrada sandstone with pinyon-juniper and desert shrubs; 4,800 to 6,850 feet.	N	1	MLNF
Goodrich blazingstar *Mentzelia goodrichii*	Erosive escarpments and steep slopes of Green River formation; Scattered pinyon-juniper; Tavaputs Plateau, Utah; 7,200 to 8,600 feet.	N	1	ANF
Fish Lake naiad *Najas caespitosa*	Shallow water off Pelican Point Fish Lake, Utah; last recorded in the field in 1940 and may be extirpated.	N	1	FNF
Beaver Mountain groundsel *Packera castoreus*	Endemic to the Tushar Mountains on windswept ridges downward to spruce/fir communities in Piute County, Utah.	N	1	FNF
Podunk groundsel *P. malmstenii*	Open escarpments of gravels or talus with cushion plants, bristlecone, limber, and ponderosa pine; 8,300 to 10,400 feet.	N	1	DNF
Arctic poppy *Papaver radicatum* var. *pygmaeum*	Alpine ridge crests, saddles, and talus slopes of Red Pine shale; above 11,400 feet.	N	1	ANF, WCNF
Paria breadroot *Pediomelum pariense*	Open escarpments with pinyon-juniper and ponderosa pine; 5,600 to 8,000 feet.	N	1	DNF
Stemless beardtongue *Penstemon acaulis*	Mixed desert shrub, black and Wyoming big sagebrush, pinyon-juniper. Utah, Wyoming, and Colorado; 5,500 to 8,200 feet.	Y	Not excluded (see detailed analysis below)	ANF
Red Canyon beardtongue *P. bracteatus*	Open escarpments of gravel or talus in Claron formation with cushion plants, bristlecone, limber, and ponderosa pine; 6,900 to 8,300 feet.	N	1	FNF
Cache beardtongue *P. compactus*	Mountain brush and spruce-fir in or near outcrops of dolomite or limestone.	N	1	WCNF

Species	Habitat Description and Range	Known or Suspected to Be in Analysis Area?	Evaluation Criteria	Applicable National Forest1
Little penstemon *P. parvus*	Dry open meadows, silver and high-elevation black sagebrush; 8,500 to 10,000 feet.	Y	Not excluded (see detailed analysis below)	DNF, FNF
Pinyon penstemon *P. pinorum*	Pinyon-juniper and mountain brush communities of Pine Valley Mountains, Utah; 5,600 to 6,700 feet.	N	1	DNF
Ward beardtongue *P. wardii*	Clay semi-barrens with desert shrub, pinyon-juniper, sagebrush, shadscale, or pinyon-juniper; 5,200 to 8,000 feet.	N	1	FNF
Angell cinquefoil *Potentilla angelliae*	Rocky subalpine meadows between 10,900 and 11,100 feet.	N	1	DNF
Cottam cinquefoil *P. cottamii*	Cracks and crevices of quartzite outcrops, often shaded; 7,500 to 10,400 feet.	N	1	WCNF
Arizona willow *Salix arizonica*	Wet meadows and streamside communities. Utah, New Mexico, and Arizona; 8,200 to 10,600 feet.	Y	Not excluded (see detailed analysis below)	DNF, FNF, MLNF
Musinea groundsel *Senecio musiniensis*	Ridgetops, gravels, barrens, and talus slopes of Flagstaff limestone; 9,700 to 10,800 feet.	N	1	MLNF
Maguire campion *Silene petersonii*	Open escarpments of talus or gravel with cushion plants, bristlecone, limber, or ponderosa pine; Utah and Nevada; 7,000 to 11,300 feet.	N	1	DNF, FNF, MLNF
Rock tansy *Sphaeromeria capitata*	Open escarpments of gravels and loam soils with cushion plants, bristlecone, limber, and ponderosa pine; Wyoming, Montana, Colorado, and Utah; 7,500 to 8,000 feet.	N	1	DNF
Caespitose greenthread	Escarpments and slopes of Green River and Uinta formations; scattered pinyon-juniper, salina wildrye;	Y	1,2	ANF

Species	Habitat Description and Range	Known or Suspected to Be in Analysis Area?	Evaluation Criteria	Applicable National Forest1
Thelesperma caespitosum	Wyoming and Utah; 5,900 to 8,800 feet.			
Uinta greenthread *T. pubescens*	Wind-swept ridges in mountain mahogany, Hickey Mountain vicinity; 8,100 to 8,900 feet.	Y	Not excluded (see detailed analysis below)	WCNF
Bicknell thelesperma *T. subnudum* var. *alpinum*	Navajo sandstone and Carmel limestone between 7,300 and 9,000 feet.	N	1	DNF, FNF
Barneby woody aster *Tonestus kingii* var. *barnebyana*	Mountain mahogany and oak communities on rock outcrops.	N	1	FNF, UNF
Sevier townsendia *Townsendia jonesii* var. *lutea*	Salt desert shrub and juniper communities; 5,500 to 6,300 feet.	N	1	FNF
Smith violet *Viola franksmithii*	Shaded limestone cliffs and crevices with Douglas fir, maple, and mountain brush.	N	1	WCNF

[1]Analysis area is outside species' range.
[2]Potential habitat for the species does not exist in GRSG habitat (sagebrush-steppe) or is outside the elevation range of the GRSG.
[3]The type or intensity of the activity in the proposed action is expected to have no impact/effect on these species or their habitat.
[4]Individual animals may be accidental, dispersing, migrating, happenstance, vagrant, nomadic, or opportunistic visitors to the habitats impacted by the proposal, but no affiliation or dependence on these habitats has been shown.
[5]The associated conservation design or mitigations eliminate any potential for impact on the species.

Table 3 Species analyzed in detail because they may be affected by one of the action alternatives

Common Name	Scientific Name	Habitat Affinity
AMPHIBIANS		
Boreal toad	*Anaxyrus boreas boreas*	WET, WST, S
Columbia spotted frog	*Rana luteiventris*	WET, WST, S
BIRDS		
GRSG	*Centrocercus urophasianus*	S
Columbian sharp-tailed grouse	*Tympanuchus phasianellus columbianus*	S, GRA, MS, RIP
Mammals		
Pygmy rabbit	*Brachylagus idahoensis*	S
PLANTS		
Aquarius paintbrush	*Castilleja aquariensis*	S
Logan buckwheat	*Eriogonum loganum*	S
Stemless beardtongue	*Penstemon acaulis*	S
Little Penstemon	*P. parvus*	S
Arizona willow	*Salix arizonica*	FM, WST, RIP
Uinta greenthread	*Thelesperma pubescens*	MS, S

Key: AQ = Aquatic; SF = Spruce-fir; LPP = Lodgepole pine; FM = Forest meadows; GRA = Grassland; MS = Mountain shrub; RIP = Riparian; S = Sagebrush; WAT = Water; WET = Marshes, shallow ponds; WST = Streams

7. SPECIES INFORMATION AND IMPACTS ANALYSIS (DIRECT, INDIRECT, AND CUMULATIVE)

Because of the importance of GRSG and its habitat, it was singled out and is discussed specifically; while pygmy rabbits, Columbian sharp-tailed grouse, Columbia spotted frog, and boreal toad were grouped together for this analysis due to the similarity of the habitats they occupy in terms of association with sagebrush communities.

7.1 GREATER SAGE-GROUSE (*CENTROCERCUS UROPHASIANUS*)

Evaluating Viability

Forest Service policy based on the National Forest Management Act (NFMA) and associated regulations motivate careful consideration of the conservation status of sensitive species. In this section we briefly outline the legal foundation and the policy which establishes our approach to evaluating the contribution of habitat on NFS land to the overall viability of the GRSG, and how that evaluation differs among NFS units depending on the inherent capability and suitability of the environment.

The statutory underpinning for evaluating viability of species expressed in 16 U.S.C. §1604(g)(3)(B) requires the Secretary to promulgate regulations that shall include, but not be limited to:

(3) specifying guidelines for land management plans developed to achieve the goals of the Program which –

(B) provide for diversity of plant and animal communities based on the suitability and capability of the specific land area in order to meet overall multiple-use objectives, …

The Department published planning regulations in 1982, under which the land management plans associated with the current amendment for GRSG were written. The 1982 regulations included the viability provision at 36 CFR 219.19:

"Fish and wildlife habitat shall be managed to maintain viable populations of existing native and desired non-native species in the planning area. For planning purposes, a viable population shall be regarded as one which has the estimated numbers and distribution of reproductive individuals to insure its continued existence is well distributed in the planning area. In order to insure that viable populations will be maintained, habitat must be provided to support, at least, a minimum number of reproductive individuals and that habitat must be well distributed so that those individuals can interact with others in the planning area".

All Forest Plans being considered for amendment to address GRSG conservation and recovery were developed under the 1982 planning regulations. This Biological Evaluation considers management guidance for GRSG on NFS lands in Utah, and assesses the outcomes of five alternatives and the Proposed Alternative for amendment of plans for each of six NFS land management units. The six NFS units differ substantially in the inherent distribution and quality of GRSG habitat. Some NFS units may occur at an elevation and in ecological settings such that they support certain life history needs, but not others. As a result, GRSG may use National Forest System lands for only a portion of the year (e.g. for summer brood-rearing habitat). In contrast other units may provide year-round habitat. Differences among NFS units result largely from the environmental setting, and therefore the inherent capability of the environment to support particular sagebrush ecosystems varies.

As outlined in the *FEIS and referenced in this Biological Evaluation* the capability of NFS lands to support self-sustaining populations of GRSG is limited. The national forests contain relatively small areas of GRSG habitat, and often the habitat on NFS land only contributes to particular life cycle requisites. This is the case on most of the National Forests in Utah.

Consequently, the assessment of whether habitat on NFS land is sufficient to maintain viable populations of GRSG must consider the contribution of habitat on NFS land to GRSG persistence, recognizing the inherent limitations on the ability to meet needs for all GRSG life stages from habitat located exclusively on NFS land. As recognized in the NFMA, the ability of the Forest Service to provide for diversity of animal communities is limited by "the suitability and capability of the specific land area..." 16 U.S.C. & 1604(g)(3)(B). Accordingly, this BE considers the contribution of these six NFS units to GRSG viability as follows:

- Forest plans provide for management of the environment to provide habitat to meet species' requirements associated with the particular seasons and life history stages supported on National Forest System (NFS) lands;

- Because GRSG spend only a portion of the year on NFS lands in response to the inherent capability and suitability of the lands (e.g. breeding habitat occurs off NFS), there are threats and stressors to species' which occur off of NFS land, and therefore over which the Forest Service has no jurisdiction or control;
- Managing habitats on NFS land to contribute to the support of persistent populations on NFS land is not the same as ensuring species viability over its entire range;
- The scale of analysis to assess the contribution of habitat on NFS land to GRSG viability is the planning unit, which is generally considered a national forest.
- The five alternatives and the proposed alternative represent various scenarios for multiple resource management on NFS land with differing outcomes for GRSG. For each alternative, we end our discussion in this Biological Evaluation with a determination regarding the likelihood that the scenario provides conditions to support the ***persistence*** of GRSG on the NFS units ***to meet the associated life cycle requisites*** that land is suitable for and capable of providing, based on the combined outcomes of regulatory restrictions and restoration of habitat.

7.1.1 Life History

GRSG depend on a variety of semiarid shrub-grassland (shrub steppe) habitats throughout their life cycle and are considered obligate users of sagebrush (e.g., *Artemisia tridentata* ssp. *wyomingensis* (Wyoming big sagebrush), *A. t.* ssp. *vaseyana* (mountain big sagebrush), and *A. t. tridentata* (basin big sagebrush; Baker et al. 1976; Connelly et al. 2000; Connelly et al. 2004; Miller et al. 2011). GRSG also use other sagebrush species (which can be locally important) such as *A. arbuscula* (low sagebrush), *A. nova* (black sagebrush), *A. frigida* (fringed sagebrush), and *A. cana* (silver sagebrush; Schroeder et al. 1999; Connelly et al. 2004). GRSG distribution is strongly correlated with the distribution, connectivity, and patch sizes of sagebrush habitats (Schroeder et al. 2004; Connelly et al. 2011b). GRSG exhibit strong site fidelity (loyalty to a particular area) to seasonal habitats (i.e., breeding, nesting, brood rearing, and wintering areas; Connelly et al. 2004; Connelly et al. 2011a). Adult GRSG rarely switch from these habitats once they have been selected, limiting their ability to respond to changes in their local environments (Schroeder et al. 1999). (Life history, habitat conditions, and population information sections were copied from Manier et al. [2013], from the USFWS Final Conservation Objectives Team (COT) report [USFWS 2013], and from the BLM draft EIS Chapter 3.)

7.1.2 Habitat and Population Condition by Forest

Greater Sage-Grouse habitats in Utah comprise the southern periphery of the species range. Suitable habitats historically occurred in basin and range conditions, and habitats consist of small to large patches of sagebrush communities in a larger matrix of mountain and canyonland topography. The state supports approximately 8% of the species' range-wide population. The connectivity of suitable habitats with and between adjacent states may be important in assuring the persistence of these populations. Although BLM lands provide the largest amount of habitat in Utah, National Forest system lands provide 845,508 acres of PHMA that are important in providing key habitat for some populations, and in maintaining connectivity for these populations.

Habitat conditions and population information were largely taken from the USFWS Final COT Report (USFWS 2013) and from the BLM Draft EIS Chapter 3. Priority Areas for Conservation (PACs) identified in the COT Report (USFWS 2013) were identified and associated with National Forests potentially supporting habitats in Utah and portions of Utah National Forests extending into Wyoming (i.e., portions of the Uinta-Wasatch-Cache and Ashley). Table 4 displays the COT PACs associated with sage-grouse populations, along with their likelihood of persistence. Analysis of persistence in the COT report, (cf. Garton et al. 2011 and Garton et al. 2015) is evaluated using short- and long-term quasi-extinction time-frames (2037 and 2107, respectively).

Garton et al. (2015) published a follow-up report building on the range-wide analysis of Garton et al. (2011). The 2011 book chapter in Knick and Connelly (eds.) 2011 evaluated changes in GRSG populations from roughly 1965 to 2007 examining population trajectories at multiple spatial scales. The more recent manuscript employed the same analytical methods but extends the field survey data to include 2008 through 2013. Garton et al (2015) provides reconstructed estimates for population trajectories across the species' range using for the array of populations examined in 2011.

From 2007 to 2013, data suggests that minimum counts for breeding males range-wide fell from 109,990 to 48,641, a decline of 56%. Using population persistence models consistent with those from Garton et al. (2011), Garton et al. (2015) examines future scenarios for males range-wide (excluding Colorado) and for individual populations at multiple spatial scales. For example, a minimum number of males counted at leks for the entire range-wide distribution, excluding Colorado, were 40,505 birds in 2013 and projected to decline to 19,517 males in 30 years (2030), and 8,154 males in 100 years (2107) based on the scenario examined.

As outlined in past review, many factors potentially contribute to projected declines (Stiver, et al. 2006, NTT 2011, USFWS 1013; e.g. drought, climate change, disease, invasive plants, wildfire, habitat destruction). Garton et al (2015) suggests that environmental conditions and management actions through 2013 have not reversed the pattern of population declines observed in most populations since the 1970's or 1980's. Alternative A (continue current management) as outlined in this FEIS, most closely reflects the scenario examined in Garton et al (2011) and Garton et al (2015). As noted earlier, the Determinations in this biological evaluation reflect an evaluation of conditions for GRSG and the consequences of management for future populations of GRSG under each of the analyzed alternatives for NFS lands based on requirements for providing environmental conditions to assure the persistence of GRSG habitats within the capability of the unit to support these habitats when GRSG use them. . The evaluation for each alternative carefully considers the context provided by the Garton et al (2011) and Garton et al (2015) analysis for those population using NFS lands.

Table 4. Likelihood of persistence of GRSG populations by management zones, and associated Priority Areas for Conservation in Utah that include National Forests based on analysis of population data through 2007 (USFWS 2013).

Population Area	Fewer than 200 Males/500 Birds in 2007	Percent Chance of Fewer than 50 Birds/20 Males in 2037	Percent Chance of Fewer than 500 Birds/200 Males in 2037	Percent Chance of Fewer than 50 Birds/20 Males in 2107	Percent Chance of Fewer than 500 Birds/200 Males In 2107
Management Zone II: Wyoming Basin	NA	0.1	0.2	16.1	16.2
9a-Wyoming Basin	N	0	0	9.9	10.7
9b-Rich-Morgan Summit (Wyoming Basin in Utah)[1]	N				
9c-Uintah (Wyoming Basin in Utah)	N				
Management Zone III: Southern Great Basin	NA	0	0	6.5	7.8
10a-Strawberry Valley (northeast Utah)	Y	0.8	51.8	8.8	78.6
10b-Carbon County (northeast Utah)	Y	0.8	51.8	8.8	78.6
11-Sheeprock (Utah, a.k.a. Tooele-Juab Counties)	Y	56.6	100	100	100
12-Emery (Utah, a.k.a. Sanpete-Emery Counties)	Y	77.2	100	99.2	100
13a-Greater Parker Mountain (part of south-central Utah)	N	0.0	3.2	1.1	21.0
13b-Panguitch (part of south-central Utah)	N	0.0	3.2	1.1	21.0

[1] This UT management area includes Summit-Morgan Counties, which is described separately by Garton et al. (2011) as a subpopulation in Management Zone III. Numbers for columns 2-4 for this population are 20.6, 100, 41.8, and 100, respectively (Garton et al. 2011).

Ashley National Forest

The Ashley National Forest falls within the Uinta Sage-grouse Management Area (PAC 9c). Throughout the area (not just in the National Forest) there were an estimated 452 males on leks as of 2011. In the northern portion of this area is the Diamond Mountain and Browns Park population, a significant population center for GRSG in Utah, Colorado, and Wyoming. Limited data are available for some of the leks throughout this area. Some show declines, while a few others showed limited recovery during the past 20 years. Two of the largest leks in the area showed significant increases in recent years. Based on current management strategies and threats and known population numbers in this area, Garton et al. (2011), suggested that there was zero and 11 percent chance of the population dropping below 500 birds/200 males by 2037 and 2107, respectively. Sagebrush communities on the Ashley National Forest contribute to breeding, nesting and brood-rearing habitats in northeastern Utah. Winter habitats are found primarily off-Forest at lower eleveations.

The central and southern portions of the management area provide habitats for small isolated populations with low connectivity and low potential for habitat improvement. These populations are largely a function of the availability of suitable sagebrush habitats in otherwise unsuitable landscapes. The Anthros Mounatin population is an example. Although the population, and its associated habitats, are isolated from other populations, there is evidence that in may be important in providing connectivity between populations to the west (e.g. Strawberry) and to the east (e.g. Tavaputs). There are a total of 170,130 acres of PHMA and 54,692 acres of GHMA on the Ashley National Forest.

Dixie National Forest

The Dixie National Forest includes a portion of the Greater Parker Mountain Sage-Grouse Management Area and the Panguitch Management Area in south-central Utah (PACs 13a and 13b). The Parker Mountain area had an estimated 821 males on leks in 2011. Only a portion of the aforementioned leks, male grouse, and habitat is in the Forest. The Panguitch portion has more than a dozen leks that are often interconnected, with an estimated 304 males in 2011. Only a few leks are found on Forest Service lands. There is a high degree of variability in the number of males in attendance among these leks. Based on current management strategies and threats and known population numbers in this area, Garton et al. (2011), estimated that there was 3.2 percent and a 21 percent probability of the population dropping below 500 birds/200 males by 2037 and 2107, respectively

Portions of the Parker population that are in the Forest boundaries are part of one of the most contiguous and connected GRSG habitats in the state. It is generally made of a single large gently sloping plateau with black sagebrush on the flats and big sagebrush in the drainages and on the uplands. It contains stringers of aspen at the higher elevations. For the Panguitch area, the population is distributed north-south in a series of linked valleys and benches and with suitable sage-grouse habitats constrained by mountains and canyons. Movement of GRSG from one valley or bench to another among seasons is necessary to meet their seasonal habitat requirements in the highly variable annual weather conditions of this region. This area has the highest potential for increase in Utah due to habitat treatments to remove pinyon-juniper encroachment into sagebrush habitats. In the Dixie National Forest, there are 183,886 acres of PHMA.

Fishlake National Forest

The southern end the Fishlake National Forest, at, also includes a portion of the Greater Parker Mountain Sage-Grouse Management Area (PAC 13a) in south-central Utah. The Parker Mountain area had an estimated 821 males on leks in 2011 and contains one of the most contiguous and connected habitats in the state. Only a portion of the aforementioned leks, male grouse, and habitat occurs on the Forest, generally the higher elevation sagebrush habitat. At the northernmost point of the Fishlake National Forest, there is also a small portion of the Emery Sage-Grouse Management Area (PAC 12). This is a small isolated population using patches high elevation sagebrush steppe communities constrained by mountain and canyon areas. On the Fishlake National Forest, there are 180,452 acres of PHMA. Based on current management strategies and threats and known population numbers in this area, Garton et al. (2011) estimate that there was a 3.2 percent and a 21 percent probability of the Greater Parker population dropping below 500 birds/200 males by 2037 and 2107, respectively. The Emery population was assigned a 100% chance of dropping below 500 birds/200 males in 2037. This is a function of a a naturally small, isolated population that is already below that threshold.

Manti-La Sal National Forest

The Manti-La Sal National Forest contains a portion of the Carbon Sage-Grouse Management Area (PAC 10b) in the northern portion of the Colorado Plateau in central Utah. This management area (across all jurisdictions of lands) had an estimated 119 males on leks as of 2011. In addition, on the southern boundary of the Manti-La Sal National Forest, there is a small isolated population called the Emery Sage-Grouse Management Area. In both of these areas, lek count data from 1970 to 2000 are incomplete; some lek groups show declines, while others appear to be stable. Based on current management strategies and threats and known population numbers in this area, Garton et al. (2011) suggested that there was 51.8 percent and 100 percent chance respectively of both the Carbon and Emery populations dropping below 500 birds/200 males by 2037.

The Carbon population area is characterized by highly broken terrain, with deep canyons and mid-elevation plateaus. Telemetry studies in the area suggest that occasionally GRSG move to and from the adjacent Strawberry Valley population. The Emery area, supports a small, mostly isolated GRSG population that occupies high elevation sagebrush steppe on the eastern slope of the Wasatch Plateau. Although no direct movement between these areas has been documented, this population is relatively close to the south-central Utah population (Parker Mountain portion). On the Manti-La Sal National Forest, there are 96,072 acres of PHMA.

Uinta-Wasatch-Cache National Forest

The Uinta-Wasatch-Cache National Forest is a consolidated land management unit that contains portions of multiple GRSG management areas in the northern portion of Utah. The Rich-Morgan-Summit Sage-Grouse Management Area in northeastern Utah is a part of the Wyoming Basin population (PAC 9a), a significant population center for grouse in Utah, Idaho, Colorado, and Wyoming. This management area also includes part of what is mapped in Garton et al. (2011) as Summit-Morgan Counties in Management Zone III. This portion of the population is regarded as stable, with a potential for growth, and resiliency to known threats.. Based on a ten-year average count of males on leks (on all land jurisdictions), the area had an estimated 1,223 males as of 2011. Based on current management strategies and threats and known population numbers in this area, Garton et al. (2011) suggested that there was zero and 11 percent probability of the population dropping below 500 birds/200 males by 2037 and 2107, respectively. The habitat is

composed of mountain and big sagebrush communities, with differing levels of forb and grass diversity and abundance, based on past and current management regimes.

The Strawberry Valley Sage-Grouse Management Area (PAC 10a) in central Utah is a significant population center for GRSG in the state, with NFS lands providing a large contribution to the habitat. This management area had an estimated 82 males on leks as of 2011. Significant restoration has been conducted on this population primarily consisting of harrow and mowing treatments, and it is the most intensively managed in Utah. This population is regarded as stable with a high potential for growth. The baseline (2007) population was below 500 birds/200 males. Based on current management strategies and threats and known population numbers in this area, Garton et al. (2011) estimated that there was 51.8 and 78.6 percent chance of the population dropping below 500 birds/200 males by 2037 and 2107, respectively. Habitat consists of mountain big sagebrush in Strawberry Valley, with silver sagebrush in the more mesic sites and stringers of aspen at higher elevations. The migratory and wintering area to the east is drier and comprised of Wyoming big sagebrush communities, with more pinyon-juniper moving off the slopes into the valleys.

The Sheeprock population (PAC 11) is an isolated population center and is also known as the Sheeprock Mountains Management Area. Garton et al. (2011) refers to this area as the Tooele-Juab Counties population. This population had an estimated 102 males on leks as of 2011. This population is regarded as stable, with a potential for growth. Based on current management strategies and threats and known population numbers in this area, Garton et al. (2011) suggested that there was a 56.5 percent and a 100 percent probability of the population dropping below 50 birds/20 males by 2037 and 2107, respectively; and a 100 percent chance of falling below 500 birds/200 males by 2037. The population is isolated from other sage-grouse populations in Utah by landscapes that have been significantly altered by urbanization and agricultural uses on private lands. Habitat is composed of Wyoming big sagebrush and less diverse understories than would be found in more mesic high elevation sites.

There are 139,159 acres of PHMA and 21,117 acres of GHMA on the Uinta-Wasatch-Cache National Forest.

7.1.3 Threats by Forest

Table 5 identifies potential threats (USFWS 2013) for the GRSG populations on Utah's National Forests and those portions that extend into Wyoming, as well as the contribution of management on Forest Service-administered lands to contend with those threats. These threats were further refined for the specific National Forests associated with the populations.

Ashley National Forest

Key threats to GRSG on and around the Ashley National Forest are predation, wildfire, invasive plants and noxious weeds, avian diseases, and existing and future anthropogenic uses. GRSG in the management area generally show resiliency to known threats. Small, naturally isolated populations on the Ashley National Forest may be at increased risk due to further habitat loss from anthropogenic uses.

Dixie National Forest

Key GRSG threats on and adjacent to the Dixie National Forest are loss or degradation of habitat (primarily due to vegetation succession), conversion of habitat (sagebrush to pinyon-juniper or cheatgrass at the lower elevations), increased predation due to expansion of, or changes in, the

native predator community in response to anthropogenic factors, and reduced habitat connectivity. Additionally local issues may be impacts from historical and current livestock grazing, energy development, and adjacent residential and commercial development.

Fishlake National Forest

Key GRSG threats on and around the Fishlake National Forest are loss or degradation of habitat (primarily due to vegetation succession), conversion of habitat (sagebrush to pinyon-juniper or cheatgrass at the lower elevations), increased predation because of expansion of, or changes in, the native predator community in response to anthropogenic factors, and habitat lossf or degradation of habitat that results in a loss of GRSG habitat connectivity. Local issues are livestock grazing, degraded sagebrush habitats, with sagebrush that is too dense in some areas and only adequate in others.

Table 5 Potential threats for GRSG populations on National Forest System lands in Utah and the portion of those forests that extend into Wyoming, based on the COT Report (USFWS 2013)[2]. Specific characteristics associated with each category of threat are further described in the COT report, NTT report and the Greater Sage Grouse Conservation Strategy.

COT Report Population Area	Isolated/Small Size	Sagebrush Elimination	Agriculture Conversion	Fire	Conifer Encroachment	Weeds/Invasive Species	Energy	Mining	Infrastructure	Grazing	Equids	Recreation	Urbanization
9a-Wyoming Basin	N	L	N	L	L	L	Y	L	Y	Y	L	Y	L
Ashley National Forest—Wyoming	N	N	N	L	L	L	L	L	L	Y	L	Y	N
W-C National Forest—Wyoming	N	N	N	L	L	L	L	L	L	Y	L	Y	N
9b-Wyoming Basin (Rich/ Summit)	N	N	N	Y	Y	Y	Y	N	Y	N	N	Y	Y
9c-Wyoming Basin (Uinta)	N	N	N	Y	Y	Y	L	Y	Y	N	N	Y	Y
Ashley National Forest—Utah	N	L	N	Y	Y	Y	Y	L	Y	Y	L	Y	N
W-C National	N	L	N	Y	Y	Y	L	N	L	Y	L	Y	N

[2] Threats are characterized as: Y = threat is present and widespread, L = threat present but localized, N = threat is not known to be present, and U = Unknown.

COT Report Population Area	Isolated/Small Size	Sagebrush Elimination	Agriculture Conversion	Fire	Conifer Encroachment	Weeds/Invasive Species	Energy	Mining	Infrastructure	Grazing	Equids	Recreation	Urbanization
Forest—Utah													
10a—Strawberry	Y	N	N	Y	Y	Y	Y	N	Y	N	N	Y	N
Uinta National Forest	Y	N	N	Y	Y	Y	Y	N	Y	N	N	Y	N
10b-Carbon	Y	N	N	Y	N	Y	Y	Y	Y	N	N	Y	N
Manti-La Sal National Forest	Y	N	N	Y	N	Y	Y	Y	Y	N	N	Y	N
11-Sheep Rock	Y	N	N	Y	L	L	Y	Y	L	N	Y	L	N
Uinta National Forest—Vernon Unit	Y	N	N	Y	L	L	Y	Y	L	N	Y	L	N
12-Emery	Y	N	N	Y	Y	Y	Y	Y	Y	N	N	Y	N
13a-Parker	N	N	N	Y	Y	Y	N	N	Y	N	N	Y	N
13b-Pnguitch	N	N	Y	Y	Y	Y	Y	L	Y	N	N	Y	L
Dixie-Fishlake National Forest	N	Y	N	Y	Y	Y	L	L	Y	Y	N	Y	L

Manti-La Sal National Forest

Key threats to GRSG and their habitats on and around the Manti-La Sal National Forest include habitat loss and isolation due to a variety of factors, including energy development (oil and gas), checkerboard ownership, wildfire, and pinyon-juniper encroachment. In addition, invasive species, predation, and disease have been and could continue to be a threat. A few of the smaller isolated populations within suitable habitat patches may be at further risk from anthropogenic uses within these areas.

Uinta-Wasatch-Cache National Forest

Key threats to GRSG on and around the Uinta-Wasatch-Cache National Forest are wildfire, invasive species (cheatgrass and knapweed), pinyon-juniper encroachment, predation, recreation-related impacts, private land management and development, isolation of some small populations, a lack of water resources at arid sites due to water being piped for livestock, and some historical and current livestock operations.

7.1.4 Alternative A—No Action

Recreation/Travel Management

Alternative A would maintain current land management; however, few Forests have specific conservation parameters in land use plans for sagebrush or GRSG.

Under this alternative there would be no changes to the current National Forest System roads, transportation plan, or recreation management in the Forest relative to GRSG. There would be minimal seasonal restrictions on casual use, and some of the areas in GRSG habitat would remain open to cross country travel, especially in winter. In general, the more acres and lineal miles of routes that are designated in an area, the greater the likelihood of habitat degradation or loss, and disturbance to GRSG. In addition, less restrictive travel conditions usually mean higher concentrations of human use next to motorized routes. This can cause disruption of nesting activities, abandonment of young, and temporary displacement.

This alternative has the highest potential to impact GRSG due to the lack of restrictions on activities that cause these impacts. Therefore all direct and indirect impacts on the species and its habitat would likely allow current trends to continue. In addition, impacts from roads may include habitat loss from road construction, noise disturbance from vehicles, and direct mortality from collisions with vehicles. Roads may also present barriers to migration corridors or seasonal habitats. This alternative has the highest potential to impact GRSG due to the lack of restrictions on activities that cause these effects. Therefore all direct and indirect effects on the species and its habitat would likely cause current trends to continue.

Fire and Fuels

[Suggest citing appropriate references on effects of fire and summarizing in 2 or 3 sentences. Then consider providing sussinct overview of Alternative A as done in Idaho BE. This would largely eliminate first 3 paragraphs of this section.] Fire (both lightning-caused and human-caused fire) in sagebrush ecosystems is one of the primary risks to the greater sage-grouse, especially as part of the positive feedback loop between exotic invasive annual grasses and fire frequency (USFWS 2013). Most sagebrush species are killed by wildfires, and recovery requires many years, especially in the case of large fires (Connelly et al. 2004).

Fire risk is extremely high throughout the planning area and is listed as one of the most significant threats to GRSG in the Box Elder, Ibapah, Hamlin Valley, Uintah, Carbon, Emery, Sheeprock, and Bald Hills population areas (USFWS 2013). Existing forest plans typically do not include specific management for fuels treatments in sagebrush habitat.

Both prescribed fire and non-fire fuels treatments are allowed in current forest plans, and fire suppression is prioritized to protect human life and specific resource values at risk. Alternative A would continue to manage wildfire and prescribed burns under current direction which would have the fewest restrictions for fire and fuels management actions and a high potential for vegetation disturbance. Prescribed burns could be used within sagebrush habitat where needed to control fuel loading. Policies would not prioritize protection or restoration of mature sagebrush habitat. Increased human activity and noise associated with wildland fire suppression and prescribed fire in areas occupied by sage-grouse could disrupt nesting, breeding, or foraging behavior. Important habitats could be removed or degraded because of the use of heavy equipment or hand tools. Other potential impacts may include injuring or killing eggs/chicks, causing changes in species movement patterns due to areas devoid of vegetation, or reducing population viability and increasing the contribution to the need to list the species.

In addition, suppression may initially result in higher rates of juniper encroachment in some areas. In the initial stages of encroachment (phase 1), fuel loadings remain consistent with the sagebrush understory. As juniper encroachment advances (phases 2 and 3) and the understory begins to thin, the depleted understory causes the stands to become resistant to wildfire and further alter fire return intervals. During years of high fire danger, the resulting heavy fuel loadings in these stands can contribute to larger-scale wildfire events and confound control efforts due to extreme fire behavior.

Invasive Plants

Invasive weeds alter plant community structure and composition, productivity, nutrient cycling, and hydrology. They may cause declines in native plant populations, including sagebrush habitat, through competitive exclusion and niche displacement, among other mechanisms, particularly by changing the fire regime resulting in the loss or significant resuction in shrub cover. Invasive plants reduce and, in cases where monocultures occur, eliminate vegetation that GRSG use for food and cover.

Invasive plant communities do not provide suitable GRSG habitat, since the species requires sagebrush, a variety of native forbs, and very often the insects associated with them. GRSG eat sagebrush year-round and use it exclusively throughout the winter for food and cover. Along with competing with vegetation essential to GRSG, invasive plants fragment GRSG habitat and reduce habitat quality. Invasive plants may also alter long-term changes in ecosystem processes, such as fire cycles and other disturbances that persist even after invasive plants are removed (Connelly et al. 2004, pp. 5-9).

The spread and establishment of invasive species is a major threat to the population areas of Utah (USFWS 2013). Under current management (Alternative A), the Forest Service uses mechanical, manual, chemical, and biological control to reduce the likelihood of invasive weed spread and the extent of current infestations. This issue is intimately tied to the threat from fire and fuels management actions, which reduce weeds and create fire breaks.

Under Alternative A, the Forest Service would continue to control noxious weeds and invasive species using integrated weed management actions, in cooperation with state and federal agencies, affected counties, and adjoining private landowners. However, there are no specific

objectives in forest plans to focus these efforts on eradicating cheatgrass or sagebrush communities. These actions would improve GRSG habitat, along with other vegetation types, but would not specifically prioritize management in these areas.

Conifer Encroachment

Pinyon-juniper woodlands may encroach onto sagebrush ecosystems, which reduce and eventually eliminate GRSG habitat in these areas. Pinyon-juniper invasion reduces shrub cover, and the season of available succulent forbs is shortened due to soil moisture depletion (Crawford et al. 2004, p.8). In higher elevation areas, Douglas-fir may also encroach onto mountain big sagebrush communities.

To treat pinyon-juniper, the Forest Service frequently uses mechanical and chemical treatments, hand-cutting, and prescribed burning to reduce conifer encroachment onto sagebrush communities. Conifer encroachment is a substantial threat to the Box Elder, Panguitch, Parker Mountain, Emery, and Uintah GRSG population areas.

Fire suppression policies can contribute to increased pinyon-juniper spread (USFWS 2013). Alternative A does not take any specific actions to prevent conifer encroachment, but many forest plans contain objectives for maintaining, improving, or restoring sagebrush plant communities often for big game winter range and livestock grazing. However, these approaches do not specifically address the threat of conifer encroachment to benefit GRSG and thus would likely have limited effectiveness in controlling the invasion.

Minerals and Energy Development

Energy development can result in direct habitat loss, degradation of important habitats by roads, pipelines, and power lines, and noise and direct human disturbance. The interaction and intensity of impacts could cumulatively or individually lead to habitat loss and fragmentation in the long term (Connelly et al. 2000, Holloran and Anderson 2005, pp. 57-60). Renewable energy facilities, including those for solar and wind power, typically require many of the same features for construction and operation as do nonrenewable energy resources. Therefore, direct impacts from habitat losses and disturbance through roads and power lines, noise, and increased human presence would generally be similar to those for nonrenewable energy development (USFWS 2010, pp. 13951-2).

Under Alternative A, all mineral leasing and development and wind energy development would continue to be managed under current direction. A small percentage of PHMA would be closed to nonenergy leasable mineral leasing, with the remainder of all designated habitats open to leasing (including new lease expansion), with no cap on surface-disturbing activities. As such, this alternative would be expected to cause the greatest amount of direct and indirect impacts on GRSG and their habitat including habitat loss and degradation by roads, pipelines and power lines, higher levels of noise, increased presence of roads/humans, and a larger number of anthropogenic structures in an otherwise open landscape that could result in abandonment of leks, decreased attendance at the leks that do persist, lower nest initiation, poor nest success, decreased yearling survival, and avoidance of energy infrastructure in important wintering habitat.

Infrastructure

Human developments, such as power lines, communication towers, fences, roads, and railroads, contribute to habitat loss; power lines and roads have the largest impacts (Connelly et al. 2004;

Naugle et al. 2011). Human disturbance increases over the short term during infrastructure construction.

In the long term, increased threats from avian predators perching on infrastructure may cause GRSG numbers to decline. Power lines can directly affect GRSG by posing a collision and electrocution hazard, increasing predation, reducing connectivity, and facilitating the invasion of exotic plants (Braun 1998, pp. 145-146; Connelly et al. 2004, pp. 12, 25). Power lines are linear and often extend for many miles. Thus, ground disturbance from power line construction, as well as vehicle and human presence during maintenance, may introduce or spread invasive weeds over large areas, thereby degrading habitat.

Cellular and other communications towers could cause GRSG mortality via collisions, influence movements to avoid tall structures or electromagnetic radiation, or provide perches for corvids (primarily ravens) and raptors (Connelly et al. 2004, p. 7).

Wisdom et al. (2011) reported the mean distance to cellular towers in extirpated GRSG range at 13.7 miles, was almost twice that of occupied range, at 7 miles. GRSG have been observed to avoid brood-rearing habitats within 3 miles of power lines (LeBeau 2012). Higher densities of power lines within 4 miles of a lek negatively influence attendance (Walker et al. 2007).

Additionally, the tendency of GRSG to fly relatively low in low light or when harried may put them at high risk of collision with power lines (Manier et al. 2013, p. 81). In addition, research suggests that road traffic within 4.7 miles of leks negatively influence male lek attendance (Connelly et al. 2004). Lek count trends have been found to be lower near interstate, federal, and state highways, compared to secondary roads (Johnson et al. 2011). Impacts from roads may include direct habitat loss from road construction and direct mortality from collisions with vehicles. Roads may also present barriers to migration corridors or seasonal habitats.

Other impacts are facilitation of predator movements, spread of invasive plants, and human disturbance from noise and traffic (Forman and Alexander 1998, pp. 207-231). Habitat loss may be reduced by closing and reclaiming unused, minimally used, and unnecessary roads in and around sagebrush habitats during seasonal use by GRSG (NTT 2011, p. 11).

Railroads presumably have the same potential impacts on GRSG as do roads because they create linear corridors in sagebrush habitats, resulting in habitat loss and fragmentation, and other disturbance. In addition, fence poles provide predator perch sites and potentially predator corridors along fences (particularly if a road is nearby). Fences and their associated roads may allow for the invasion or spread of invasive weeds along the fencing corridor. Furthermore, fences may effectively fragment habitat because GRSG may avoid habitat around the fences to escape predation (Braun 1998, p.145).

Cross-country motorized recreation, even in winter, is very destructive to GRSG and would continue under Alternative A. Also, there would be no changes to the current approach to exchanging, acquiring, and disposing of lands or with permitting ROWs on Forest Service-administered lands.

All Forest Service-administered lands would continue to be managed according to Forest Service policy and regulation. Permitted ROWs would continue to allow construction, maintenance, and operation, which could result in habitat loss or degradation for GRSG. Indirect impacts may include new infestations of noxious or invasive weeds and an increase in edge habitat. Though most project proponents would be forced to mitigate or minimize impacts, this alternative would likely have the greatest impact on GRSG and habitat.

Livestock Grazing and Feral Horses

Livestock grazing may have both beneficial and detrimental impacts on sagebrush habitats, depending on site-specific management (USFWS 2010, p. 13998). Grazing can be used as a tool to reduce fuel load, reduce spread of noxious and exotic weeds, protect intact sagebrush habitat, and increase habitat extent and continuity (Connelly et al. 2004).

Rangelands meeting forest plan standards may also provide effective wildlife habitat. However, grazing at inappropriate intensity, season, or location may degrade sagebrush ecosystems over the long term by changing plant communities and soils. This could lead to lost vegetation cover and plant litter, increased erosion, decreased water quality, and reduced overall habitat quality for wildlife, including GRSG (Knick and Hanser 2011, Connelly et al. 2004).

The reduction of grass heights from grazing could reduce cover suitability and habitat availability by increasing exposure to predators. Livestock may also occasionally trample nests and eggs (Coates 2007, pp. 28, 33) or disturb reproduction in other ways. At the planning scale, the Forest Service can decide whether areas would be open or closed to livestock grazing. Future impacts would be eliminated in areas closed to grazing, but past impacts would likely persist, and closing grazing may result in other impacts, such as fuel buildup.

At the implementation level, the Forest Service can consider changes in grazing practices or systems, which could reduce grazing intensity or change the season of use, for example. In addition, changes in grazing management in riparian and wet meadows can reduce impacts in these important seasonal habitats.

Approximately 40,000 free-roaming horses and burros live in the western US and are found in approximately 18 percent of occupied GRSG range (Connelly et al, 2004; Beever and Aldridge 2011), primarily on BLM-administered lands. A horse consumes 20 to 65 percent more forage than a cow of equivalent size; also, horses can use higher elevation areas and steeper slopes, so they graze a wider swath of sagebrush (Connelly et al. 2004).

Under Alternative A, the Forest Service would continue to make GRSG habitat available for livestock grazing. Active animal unit months (AUMs) for permitted livestock grazing would be 329,521 on BLM-administered lands and 265,373 on Forest Service-administered lands; however, the number of AUMs on a permit may be adjusted during permit renewals, allotment management plan (AMP) development, or other appropriate administrative activity.

Wild horse and burro AUMs would also remain at current levels. These policies may contribute to GRSG habitat degradation if current grazing practices are not meeting forest plan proper use parameters. Under Alternative A, there would be no change in the numbers, timing, or method of livestock grazing in the Forest, nor would there be any changes to wild horse or burro management.

Other potential impacts on GRSG habitat are overgrazing, reduction in cover and structure, loss of diversity due to consumption, and degradation of meadow/wetland/spring/stream habitat crucial for reproduction.

7.1.5 Alternative B

Recreation/Travel Management

Under this alternative there would be limited opportunities for road construction and improvement in PHMA, with minimum standards applied and no upgrading of current roads. PGMA would be designated as per the travel management plan in the current planning document. Routes would be evaluated for seasonal closure to reduce functional loss of habitat and habitat degradation from routes in important habitats. The habitat disturbance limitation of 3 percent would apply for new roads associated with valid existing rights. In addition, recreation permits would be given in PHMA only if there were a neutral or beneficial impact on GRSG; no cross-country driving would be permitted in PHMA. This is more restrictive than Alternative A, allowing fewer anthropogenic influences on sagebrush habitats and GRSG by minimizing human use and road construction and upgrading. Not allowing upgrades of existing roads would also limit disturbance and degradation within GRSG habitat.

Fire

Fire is among the greatest threats to GRSG in Utah. Under Alternative B, fuels treatments in PHMA would be designed and implemented to emphasize protection of existing sagebrush ecosystems. Fuels management programs would consider GRSG habitat needs, and fire suppression would prioritize protection of habitat, after life and property. Grazing management would be considered as a tool to reduce fuel loading. These policies would be likely to reduce the acres of sagebrush burned in wildfires or lost during fuels treatment programs. As such, these policies would protect GRSG and habitat more than Alternative A.

Invasive Plants

Under Alternative B, the Forest Service would continue to control noxious weeds and invasive species using integrated weed management actions, in accordance with existing plans to control, suppress, and eradicate noxious and invasive species. Vegetation management and restoration programs would prioritize sagebrush reestablishment and weed control as part of habitat management, and grazing management programs would consider noxious weed control. These policies would likely protect more acres of sagebrush from invasive weeds because of the greater emphasis they place on sagebrush reestablishment. However, the actual change in the probability of invasive weed establishment would depend on the resources available to devote to the effort.

Conifer Encroachment

Under Alternative B, encroaching conifers would be monitored and controlled in fuels treatment areas and in relation to PHMA. Restoration in seasonal habitats would be prioritized, which would reduce degradation and habitat loss for GRSG. As a result, more emphasis would be placed on conserving and restoring sagebrush ecosystems than those described under Alternative A.

Minerals and Energy Development

Under Alternative B, lands in PHMA would be closed to nonenergy leasable mineral leasing and to mineral material sales, including not permitting existing mines to expand. This action would greatly reduce the acreage open to mineral leasing, compared to Alternative A. Lands in PHMA would also be classified as unsuitable for surface exploration for coal and would be proposed for withdrawal from locatable mineral entry.

Unleased areas in PHMA would be closed to fluid mineral leasing, greatly increasing the habitat acreage protected from energy development. Conservation measures, including NSO stipulations, would be applied to existing lease areas. GHMA would remain open to leasing and energy development, with appropriate conservation measures. These policies would reduce the acreage affected by energy development in the planning area, compared to Alternative A, by limiting the impacts of energy development, including disturbance and habitat degradation. Alternative B would provide protection now and in the future for the most important GRSG habitats, which encompass many acres.

Infrastructure

Limiting infrastructure construction would reduce the risks posed by roads and transmission lines, such as increased predation, collision, and degradation of habitat. Under Alternative B, PHMA would be exclusion for new ROWs, and the acreage excluded from ROW construction would be greatly increased over Alternative A (GHMA would be ROW avoidance). The acreage limited to existing routes would be greatly increased over Alternative A, and the acres open to off-road vehicles (ORVs) would decrease. These policies would protect PHMA from ROW and road construction more than Alternative A. Under Alternative B, PHMA would be managed as exclusion, and GHMA would be managed as avoidance for new ROW projects.

Livestock Grazing and Feral Horses

Excessive or poorly managed grazing may degrade GRSG habitat. Alternative B would not reduce the area open to livestock or feral horse grazing, nor would it directly reduce AUMs. However, in PHMA, the Forest Service would incorporate GRSG habitat objectives and management considerations into grazing allotments through AMPs or permit renewals. Alternative B would adjust grazing direction in GRSG PHMA, which accounts for about 10 percent of Forest Service-administered lands in Utah. The impacts from livestock grazing, vegetation disturbance, and range improvements would be similar under Alternative B as it would be under Alternative A; the exception is that it would provide a few more restrictions to protect GRSG habitat. Not only would that minimize disturbance, but it would provide a very minor positive impact on the PHMA habitat, likely creating small pockets of improved areas for productive GRSG breeding, nesting, and brood rearing.

7.1.6 Alternative C

Recreation/Travel Management

Impacts would be similar to those described under B except in PHMA camping and other non-motorized recreation would be prohibited during certain seasons within 4 miles of a lek. In addition, there would be no new route construction within 4 miles of a lek, thereby reducing disturbance to nesting and brood-rearing GRSG and their habitat in comparison to alternatives A and B.

Fire

Alternative C would follow the same policies as Alternative B, with the additional provision that livestock would be excluded from habitat areas post-fire to allow for recovery. As with Alternative B, these policies would prioritize sagebrush preservation more than current management under Alternative A and thus would conserve more sagebrush associated species (SAS) habitat. Alternative C would have the most protective measures for GRSG. In this alternative, all occupied habitat would be managed as an exclusion area for new ROW projects.

In addition, Alternative C would encourage consolidation of GRSG habitats, facilitating habitat conservation and management.

Alternative C would have the fewest negative impacts and the most positive impacts on wildlife species whose ranges overlap with GHMA and PHMA. Impacts would be similar to those described under Alternative B, except that the same protections would be expanded to include all occupied habitat.

Invasive Plants

Alternative C would follow the same approach as Alternative A, using integrated vegetation management to control, suppress, and eradicate noxious and invasive plants. As under Alternative B, vegetation management would prioritize sagebrush reestablishment and weed control. In addition, Alternative C would help to develop methods for prioritizing and restoring sagebrush steppe invaded by or even once reseeded by nonnative plants. These policies would place greater emphasis on sagebrush reestablishment than Alternative A, further increasing habitat effectiveness. However, the actual change in invasive weed establishment would depend on the resources available.

Conifer Encroachment

Impacts from conifer encroachment under Alternative C would be the same as those described under Alternative B, but with an emphasis on a wider range of GRSG habitats focusing on sagebrush communities in general and increasing habitat quantity and effectiveness.

Minerals and Energy Development

Under Alternative C, lands in all occupied habitat would be closed to nonenergy leasable mineral leasing and to mineral material sales, including not permitting existing mines to expand. This would greatly reduce the acreage open to mineral leasing. Under Alternative C, policy changes would be the same as those described for Alternative B but would have greater impacts because they would be applied to all occupied habitat (845,508 acres). Lands in PHMA and GHMA would also be defined as unsuitable for surface coal exploration and would be proposed for withdrawal from locatable mineral entry.

Unleased areas would be closed to fluid mineral leasing, greatly increasing the extent of habitat protected from energy development. Conservation measures, including NSO stipulations, would be applied to existing lease areas. These policies would substantially reduce the available acreage for energy development, which would limit such impacts as disturbance and habitat degradation. Under this alternative, impacts would be similar to those described under Alternative B, except that the protections would be expanded to include PHMA and GHMA.

Infrastructure

Under Alternative C, all occupied GRSG habitat would be exclusion areas for new ROWs; the acreage excluded from ROW construction would be greatly increased over Alternative A. Under Alternative C, impacts would be much the same as those described for Alternative B, but they would be applicable to a larger area of GRSG habitat, thereby offering more positive impacts. The acreage limiting motorized travel to existing routes would be greatly increased over Alternative A, and ORV use would not be permitted in habitat areas. These policies would protect GRSG-occupied habitat from ROW and road construction more than Alternatives A, B, D, or E.

Limiting infrastructure construction would reduce the risks posed by roads and transmission lines, such as increased predation, collision, and habitat degradation or loss.

Livestock Grazing and Feral Horses

Alternative C1

Under Alternative C1, grazing would be closed in GRSG habitat for livestock. This change would avoid direct impacts of grazing, such as nest trampling, loss of herbaceous cover, erosion, and diminished water quality. However, removing livestock grazing may eventually increase fuel loading, particularly in areas capable of producing fine flashy dry vegetation in late summer. Wild ungulates and wild horses would still be using these areas, which may also increase as available forage increases. The complete removal of livestock grazing could improve sagebrush habitat quality initially and could help to restore important wetland and adjacent riparian habitats that support GRSG.

Alternative C2

Alternative C2 would reduce the areas open to livestock grazing and limit AUMs in allotments that overlap GRSG habitats. This alternative would also reduce wild horse AUMs by 25 percent, primarily on BLM-administered lands. These policy changes would reduce the direct impacts of grazing in comparison to Alternative A, while maintaining the vegetation diversity and fuel reduction promoted by livestock grazing. Wild ungulates would still use these areas, and that may also increase as available forage increases. Structural range improvements would be avoided to decrease the potential for introduction of invasive species that would degrade GSRG habitat. In addition, no new water developments would be authorized and existing water developments that are harmful to GRSG could be dismantled.

The reduction of livestock and feral horse grazing could improve sagebrush habitat quality initially and help to restore important wetland and adjacent riparian habitats that support GRSG.

There would be few if any negative impacts on GRSG under Alternative C with respect to range resources. This is because grazing would not only be reduced to improve conditions for GRSG in PHMA, but it would discontinue grazing in all occupied habitat (Alternative C1) or substantially reduce grazing in all allotments that overlap GRSG habitat (Alternative C2). This amounts to roughly 11 percent of the total area of National Forest lands in Utah, certainly a much higher percentage of grazing suitable lands. Additionally, under Alternative C, only habitat treatments that benefit GRSG would be allowed. Therefore, Alternative C would have the fewest negative impacts and the most positive impacts on GRSG.

7.1.7 Alternative D

Recreation/Travel Management

Under this alternative, travel would be limited to existing or designated routes within all PHMA. PHMAs that currently do not have designated routes would be designated in a travel management plan as limited to existing routes. In those areas managed as limited to existing routes, impacts on travel and transportation management under Alternative D would be the same as Alternative B. Impacts from recreational permits would be the same as those described for Alternative B because recreation permits would be given in PHMA only if there were a neutral or beneficial impact on GRSG. Impacts from other types of recreation, including recreation at developed

recreation sites and dispersed recreation would be the same as those described under Alternative A.

Fire

Under Alternative D, impacts would be similar to Alternative B. In addition, fuel breaks would be constructed to protect large blocks of sagebrush habitat. Fuels management programs would consider GRSG habitat needs, and grazing management would be considered as a tool to reduce fuel loading. These policies would reduce the acres of sagebrush burned in wildfires or lost during fuels treatment programs. As such, they would protect GRSG habitat from fire more than Alternative A.

Under Alternative D, PHMA would be managed as an avoidance area; however, new ROW projects would be allowed in designated corridors. ROWs would also be allowed in PHMA if the project would not adversely affect GRSG populations. This alternative would be more protective of GRSG than Alternative A but less protective than Alternatives B and C.

Invasive Plants

Alternative D would follow the same approach as Alternative B, using integrated vegetation management and prioritizing sagebrush reestablishment and noxious and invasive weed control. In addition, as under Alternative C, Alternative D would develop methods for prioritizing and restoring sagebrush steppe invaded by nonnative plants. These policies would place greater emphasis on sagebrush reestablishment than Alternative A. However, the actual change in invasive weed establishment would depend on the resources available to devote to control.

Conifer Encroachment

Under Alternative D, vegetation management programs would treat PHMA facing conifer encroachment in order to meet GRSG habitat objectives. Because this alternative has a specific goal of reducing conifer encroachment to protect GRSG habitat, it would likely be more effective in lowering pinyon-juniper spread than Alternative A.

Minerals and Energy Development

Under Alternative D, lands in PHMA would be closed to nonenergy leasable mineral new leasing and mineral material sales, including not permitting existing mines to expand. This action would greatly reduce the acreage open to mineral leasing compared to Alternative A. In GHMA, new leases would be allowed with stipulations to protect lek and breeding habitat. Coal leases in PHMA would be allowed, after review by the BLM and the State of Utah to determine that no essential areas are affected.

Similarly, areas not presently petitioned for withdrawal from locatable mineral entry would remain open, but conservation measures for GRSG would be applied to claimants.

Unleased areas in PHMA and GHMA would be open to fluid mineral leasing, but all acres would require NSO or controlled surface use (CSU) stipulations, whereas under Alternative A over 1 million acres have no stipulations. Conservation measures, including NSO stipulations, would be applied to existing lease areas. These proposed policies set only 22,900 PHMA acres aside as unsuitable for coal leasing (similar to Alternative A) and propose more than 3 million additional acres for locatable mineral withdrawal leasing than under Alternatives B or C (Forest Service- and BLM-administered lands combined). However, Alternative D is more similar to Alternative

B regarding energy development using stipulations to protect GRSG, compared to Alternative A; as a result, impacts on GRSG from energy development as described under Alternative A would be reduced.

Under Alternative D, PHMA would be closed to new fluid mineral leases, and existing leases would have a 4-mile NSO buffer around leks, similar to Alternative B. However with some mineral development, this alternative would allow up to 5 percent disturbance in any Utah Management Zone. Impacts would be similar to those associated with Alternative B. There may be a few more impacts if the disturbance allowance were increased from 3 percent to 5 percent. However the potential for this difference to have negative impacts on GRSG is minimal. Therefore impacts would be most similar to those described under Alternative B.

Infrastructure

Limiting infrastructure construction would reduce the risks posed by roads and transmission lines, such as increased predation, collision, and habitat degradation. Under Alternative D, PHMA within 4 miles of an occupied lek would be exclusion for most types of new ROWs. GHMA and PHMA, more than 4 miles from a lek would be ROW avoidance areas. The acreage limiting motorized travel to existing routes would be increased over Alternative A, and the acres open to ORVs would be greatly decreased.

These proposed policies would protect PHMA from ROW and road construction more than Alternative A by limiting road and ROW construction in habitat areas. Alternative D would provide less protection to PHMA from ROW construction; however, it would restrict development more than Alternative A, while allowing for increased management flexibility to improve the effectiveness of protection measures.

Alternative D is generally the same as Alternative B except that the potential for direct habitat loss and indirect impacts would be greater under this alternative compared to both Alternatives B and C. This is due largely to the 5 percent disturbance cap and allowance for development to occur in PHMA (open for development). As such, Alternative D would provide fewer protective measures to GRSG where range or habitats are coincident with PHMA. This is fewer than Alternatives B and C, but more than Alternative A.

Livestock Grazing and Feral Horses

Alternative D would not reduce the area open to livestock or feral horse grazing, nor would it reduce AUMs. Impacts would be similar to Alternative B, but under Alternative D, the Forest Service would incorporate GRSG habitat objectives and management considerations into grazing allotments in PHMA. Other actions are similar to Alternative B, and as GRSG objectives are added to grazing permit renewals, habitat quality would improve over the long-term.

Alternative D would be similar to Alternative B but would be slightly more restrictive because GRSG habitat objectives in grazing allotments would be applied to GHMA and not just PHMA. With regard to wild horses and burros, Alternative D would be similar to Alternatives B and C, but it would consider all resource values in conjunction with GRSG for wild horses and burros management.

In summary, when it comes to grazing, Alternative D would have much fewer negative impacts than Alternative A, would be similar to Alternative B, and would not go as far to generally benefit GRSG as Alternative C in respect to potential impacts posed by livestock grazing and feral horses.

7.1.8 Alternative E

(Alternative E2—the Wyoming Governor's Executive Order—applies to those Ashley National Forest lands in Wyoming. It is discussed in seven resource areas below.)

Recreation/ Travel Management

Under this alternative, impacts to nesting and winter habitats would be decreased because routes would be limited in these areas. Areas of GRSG habitat in SGMAs/core areas with nesting and winter habitat that do not have designated routes in a Travel Management Plan would be designated as limited to existing routes. This would reduce cross-country access in those areas, but would occur across a smaller area than under Alternatives B or D. Management under Alternative E would include permanent, seasonal, and time-of-day limitations on activities within 1 mile of occupied leks if the activity disrupts GRSG nesting and brood rearing. Areas of GRSG habitat in SGMAs/core areas with nesting and winter habitat that do not have designated routes in a Travel Management Plan would be designated as limited to existing routes. This would reduce cross-country access in those areas, but would occur across a smaller area than under Alternatives B or D. Outside of these areas, dispersed recreation and developed recreation sites would have impacts similar to Alternative A.

Fire

Under Alternative E, a statewide fire agency agreement would be created to eliminate jurisdictional boundaries and to allow for immediate response to natural fire in SGMA or core areas. It would allow the use of fire-retardant vegetation to buffer areas of high quality GRSG habitat from catastrophic fire. Prescribed burns would be used with caution in sagebrush habitat. These policies would be more likely to reduce the acres of sagebrush burned in wildfires or lost during fuels treatments, compared to Alternative A.

Invasive Plants

Under Alternative E, interagency focus groups would respond to new infestations to control invasive species. Additionally, known infestations in or near sagebrush habitats would be a high priority for containment for all land management agencies. Alternative E's actions would focus invasive species control on GRSG habitat more than Alternative A, but the actual change in the probability of invasive weed establishment would depend on the resources available.

Conifer Encroachment

Under Alternative E, vegetation management programs would include aggressive treatment to remove encroaching conifers and other plant species to expand GRSG habitat or increase the carrying capacity and effectiveness of habitat areas. Because this alternative has a specific goal of reducing conifer encroachment to protect GRSG habitat, it would likely be more effective in lowering the probability of pinyon-juniper spread than Alternative A.

Minerals and Energy Development

Selecting alternative E would place a 1-mile NSO restriction around occupied leks for fluid mineral development. This would reduce the likelihood of disturbance from oil and gas development on nesting habitat close to the lek. However, exceptions to this NSO would be granted if the development can be placed out of the line-of-sight of GRSG in the lek.

Generally, Alternative E would not close any lands to mineral material sales or nonenergy mineral leasing; however, it would limit impacts from mineral leasing and development through the use of conservation measures, such as seasonal timing restrictions, and best management practices (BMPs) to minimize disturbance of GRSG.

In areas outside SGMA and in non-core areas, no specific management actions would be taken. Coal leases in SGMA or core areas would be allowed, provided special conditions, conservation measures, and pre-project mitigation requirements were met. Similarly, areas not presently petitioned for withdrawal from locatable mineral entry would remain open, but conservation measures would be applied to claimants. Unleased SGMA and core areas would remain open to oil and gas leasing under NSO buffers (1 mile from leks in SGMA and 0.6 mile in core areas) and CSU and timing stipulations. Existing lease areas would remain under current management.

These policies would reduce the acreage open to energy development without stipulations, compared to Alternative A. However, the changes compared to existing policy are minor; thus, Alternative E would not be likely to substantially reduce the threat of energy development on GRSG in the planning area.

Infrastructure

Limiting infrastructure construction would reduce the risks posed by roads and transmission lines, such as increased predation, collision, and habitat degradation. Under Alternative E1, SGMA would be avoidance areas for new ROWs, and under Alternative E2 new ROWs would be excluded in core areas. No specific management actions are provided for areas outside SGMA, though non-core areas would be avoidance. The acreage limited to existing routes would be greatly increased over Alternative A, and the acres open to ORVs would decrease compared to Alternative A. These policies would provide limited measures to protect habitat in SGMA and core areas from ROW and road construction and would reduce impacts compared to Alternative A.

Livestock Grazing and Feral Horses

Alternative E would not reduce acres open to livestock or feral horse grazing, nor would it reduce AUMs. Existing grazing operations would use rangeland BMPs to increase the necessary vegetation to improve nesting success and population recruitment. To limit impacts on nesting and lekking areas, the intensity and timing of grazing in sagebrush habitats would be controlled. Alternative E makes limited provisions for reducing impacts of livestock grazing on GRSG; however, does not provide a mechanism to reduce grazing intensity in AMPs to achieve proper use grazing, relative to increasing GRSG habitat effectiveness.

7.1.9 The Proposed Plan

Recreation/Travel Management

Under The Proposed Plan, the impacts of most suggested management actions would be similar to Alternative B and D in relation to recreational activities. In PHMA, only allow special recreation permits (SRPs) that have neutral or beneficial effects to GRSG and their habitat. Existing SRPs would be evaluated for adverse effects to GRSG and their habitat, and subsequently modied or cancelled as appropriate and where possible to avoid or mitigate effects of habitat alterations or other physical disturbances to GRSG (e.g., breeding, brood-rearing, migration patterns, or winter survival). In PHMA, discrete anthropogenic disturbances, whether temporary or permanent, would be managed so they cover less than 3 percent of Biologically

Significant Units and proposed project analysis areas. The 3 percent disturbance cap would apply to new roads constructed to access existing ROWs. Routes would be evaluated for seasonal closure to reduce habitat loss and degradation. The overall travel network would be managed to minimize impacts on GRSG. These actions would reduce potential habitat impacts at levels similar to Alternative B and greater than Alternative D.

Fire

Under The Proposed Plan, impacts would be similar to Alternatives B and D; however, The Proposed Plan includes quantifiable treatment objectives designed to meet vegetation objectives; that is, 70 percent of lands capable of producing sagebrush have 10 to 30 percent sagebrush canopy cover. Annual grass and conifer treatment under the Proposed Plan would further reduce the extent of fire. In addition, In PHMA, fuel treatments would be designed through an interdisciplinary process to expand, enhance, maintain, or protect GRSG habitat. These policies would be likely to reduce the acres of sagebrush burned in wildfires or lost during fuels treatment programs. As such, they would protect GRSG habitat from fire more than Alternative A.

Invasive Weeds

The Proposed Plan would follow an approach similar to Alternatives C, D, and E, using integrated vegetation management and prioritizing sagebrush reestablishment and noxious and invasive weed control. This alternativeis similar to Alternatives C, D, and E in that an additional provision would develop and implement methods to prioritize and restore sagebrush steppe in PHMA invaded by nonnative plants. This places greater emphasis on habitat restoration in PHMA not found under Alternatives A or B.

Conifer Encroachment

Under the Proposed Plan, vegetation management programs would include treating PHMA facing conifer encroachment. This would be to meet GRSG habitat objectives to reduce conifer encroachment in PHMA. This alternative has decadal targets, based on Vegetation Dynamics Development Tool modeling, for reducing conifer encroachment to protect GRSG habitat. Because of this, it would likely be more effective in lowering pinyon-juniper spread than Alternative A.

Minerals and Energy Development

Under the Proposed Plan, lands in PHMA would be closed to nonenergy leasable mineral new leasing and mineral material sales, similar to Alternative B. New leases next to existing operations would be allowed, but they would be subject to the 3 percent disturbance cap, lek buffers, and Best Management Practices, similar to those under Alternative B. All federal mineral estate in PHMA would be open to oil and gas leasing, subject to NSO stipulations; whereas, under Alternative A, a large amount of acreage would have no stipulations. Conservation measures, including NSO stipulations, would be applied to existing lease areas. Proposed policies set aside only a minor amount of acreage as unsuitable for coal leasing (similar to Alternatives A and D). The Proposed Plan proposes more acres for locatable mineral withdrawal leasing than under Alternatives B or C. However, The Proposed Plan is more similar to Alternative B regarding energy development using stipulations to protect GRSG.

Infrastructure

Under this alternative, ROW development would be managed based on the type of ROW (e.g., major or minor, linear or site) and the ROW locations in the planning area. New major ROWs, leases, and permits (except for roads) would be allowed in PHMA only under the following conditions:

- Where the proposal could demonstrate a net conservation gain to GRSG habitat and application of RDFs
- Where there are other GRSG conservation strategies (e.g., tall structure limitations and buffering from leks) intended to reduce impacts on GRSG habitat

Limiting infrastructure construction would reduce the risks posed by roads and transmission lines, such as increased predation, collision, and habitat degradation. Under the Proposed Plan, PHMA within a range of 1.2 to 5 miles of an occupied lek would be exclusion for new elevated infrastructure. Buffer distances would be based on best available science (Manier et al. 2014) and would be calculated in accordance with the Buffer Appendix in the FEIS in the EIS. Buffer distances under Alternative D also would vary by infrastructure type and would range from 1 to 4 miles from occupied leks.

In PHMA, new structural range improvements would be designed to have a neutral impact or would conserve, enhance, or restore GRSG habitat through an improved grazing management system. Policies proposed under the Proposed Plan would protect PHMA from ROW, structures, and road construction, more than Alternative A, by limiting road and ROW construction as well as range management structures in habitat areas. The Proposed Plan is generally the same as Alternative B and would limit the potential for direct habitat loss due to infrastructure better than Alternative D. This is due largely to the 3 percent disturbance cap in PHMA.

Livestock Grazing and Feral Horses

The Proposed Plan would not reduce the number of acres open to livestock or feral horse grazing, nor reduce AUMs. Its impacts would be similar to Alternative D by incorporating GRSG habitat objectives and management considerations into grazing allotments in PHMA. However, incorporating GRSG management considerations for allotments in GRSG habitat would be expedited under this alternative because the agency would prioritize the following:

- The review of grazing permits and leases, in particular to determine if modification is necessary before renewal
- The processing of grazing permits and leases in SFA first, followed by PHMA outside the SFA

Similar to Alternative D, GRSG habitat objectives in grazing allotments would be applied to both GHMA and PHMA. With regard to wild horses and burros, herd management areas (HMAs) in GRSG habitat would be managed in established appropriate management level (AML) ranges to achieve and maintain GRSG habitat objectives. In addition, herd management plans would be amended to incorporate GRSG habitat objectives and management considerations for all HMAs in GRSG habitat, with an emphasis on PHMA.

The Proposed Plan would be similar to Alternatives B and C but would consider all resource values in conjunction with GRSG when managing wild horses and burros (similar to Alternative D). Generally speaking, if GRSG habitat is taken into consideration before applying the management action, then GRSG would likely benefit from that protection or management action. In summary, relative to grazing, this alternative would have much fewer negative impacts than Alternative A, would be similar to Alternatives B and D, and would not go as far to generally benefit GRSG as Alternative C.

Specific Protections for the Anthros Mountain Population

Habitats for the Anthros Mountain population on the Ashley National Forest are considered important in providing connectivity for sage-groue in the northeastern portion of the state. Specific guidance follows to provide conservation guidance to ensure the persistence (viability of this population on the Ashley NF.

GRSG-M-FMUL-ST-076-Standard – Do not consent to new fluid mineral leases in Anthro Mountain.

GRSG-M-FML-ST-082-Standard - Apply the following conditions of approval on existing fluid mineral leases in Anthro Mountain, consistent with valid existing rights.

- Use a phased approach for development in greater sage-grouse habitat.
- No well pads or permanent structures will be permitted within a 0.6 mile buffer of an occupied lek.
- Project-related activities and vehicle access will not be allowed in or through the 0.6 mile lek buffer.
- No project-related vehicles or activities (including routine maintenance, production vehicles, or work-over rigs) will be allowed, from 1 hour before sunset to 2 hours after sunrise within mapped sage-grouse habitat from March 1 to May 31.
- No surface disturbing activities (including construction, drilling, and well-flaring) will be allowed for wells located within mapped greater sage-grouse habitat from March 1 through June 30.
- No well pad construction, road construction, drilling, or work-over rigs will be allowed on ridge tops from November 1 to March 1 within 4 miles of a lek.
- Within mapped greater sage-grouse habitat, disturbance will be limited to an average of one disturbance per square mile (640 acres). Disturbance should be clustered in areas of habitat most distal from leks or areas of habitat least important to sage-grouse.
- Disturbance within the mapped greater sage-grouse habitat on Anthro Mountain will be no more than 3%.
- Within 4 miles of a lek, well pads and roads should avoid openings in the pinyon/juniper tracts. If avoidance of an opening is not possible, then well pads and roads should be located as close to the edge of the opening as possible.
- Noise levels at leks must be limited to no more than 10dB above ambient (not to exceed 20-24 dB), measured at the perimeter of a lek, during the breeding season (March 1 to May 31).

- Low profile tanks will be required for all well pads within mapped greater sage-grouse habitat.
- Raptor perch avoidance devices will be installed on any required tank batteries in greater sage-grouse habitat.
- Closed-loop drilling will be used for wells within greater sage-grouse habitat.
- If a new lek is discovered outside of mapped habitat, contiguous greater sage-grouse habitat within 4 miles of the lek will be mapped. Apply the same protections to the new mapped habitat and the new lek.

Summary

Impacts on GRSG and their habitats from any of the action alternatives would result in an improvement of habitat conditions for sage-grouse and there habitats on NFS lands in Utah. This would be due to a reduction of anthropogenic influences on sagebrush habitats. Overall, the Alternative A (current management) has the highest potential for adverse impacts. Currently Alternative A does not provide adequate regulatory mechanisms or assurances to protect, conserve, or enhance GRSG habitats sufficiently to assure viability of the species on NFS lands. Under Alternative A, the No Action Alternative, incremental, small-scale negative impacts are likely. Conversely, there would likely be beneficial impacts on GRSG by implementing any of the action alternatives.

Although Alternative C takes a more aggressive conservation approach to GRSG-occupied habitat, especially by eliminating grazing (Alternative C1), Alternatives B, D, and the Proposed Plan would also provide greater protections to these habitats. Though Alternative E has protective measures for GRSG, these measures are generally less conservative in terms of the number of acres protected than the other action alternatives. Differences in negative impacts between action alternatives would be negligible, and differences in positive impacts would be difficult to discern at this scale. Alternatives D and and the Proposed Plan provide a more measured approach to impacts by qualifying any potential management action by ensuring it improves conditions for GRSG and their habitats. Additional protections in the proposed plan were also added to mitigate the effects of anthropogenic impacts on the Anthros Mountain population on the Ashley National Forest. This population is deemed important in retaining the connectivity of sage-grouse and there habitats across the landscapes of northeastern Utah.

7.1.10 Cumulative Effects for Greater Sage-grouse

The cumulative effects analysis study area extends beyond the planning area boundary and consists of WAFWA MZs II, III, IV, and VII. The timeframe for this analysis is 10 years. Detailed discussion of cumulative effects methodology, analysis, and conclusions for GRSG by alternative are provided in Chapter 5 of the FEIS, herein incorporated by reference (USDI Bureau of Land Management and USDA Forest Service. 2015. Utah Greater Sage-Grouse, Final Land Use Plan Amendment and Environmental Impact Statement). Conclusions presented in the FEIS are summarized below.

Cumulative Effects Conclusion Summary

Regardless of alternative, amelioration of the major threats in WAFWA MZs II, III, and IV can be greatly enhanced by regulations enforced on state, local, and private lands. Because 51 percent of all designated GRSG habitat in MZ II and 82 percent in MZ III is comprised of BLM

administered and National Forest System lands, the relative ability of BLM and Forest Service actions to reduce the major threats—in terms of acres affected—is equal to or greater than that of tribal, state, and local governments, and private landowners.

Under Alternative A, current management would continue, and there would be less amelioration of major threats in MZs II, III, and IV than under other alternatives.

Implementation of the action alternatives would reduce major threats faced by GRSG in MZs II, III, and IV to varying degrees. Under any alternative, despite BLM, Forest Service, state, and local actions, overall trends toward habitat loss are likely to continue from human disturbance leading to spread of weeds and wildfires, and from ongoing infrastructure, energy, and residential development pressures in GRSG habitat. These threats may lead to continuing decline of GRSG, particularly in smaller and more isolated population areas.

7.2 SAGEBRUSH-ASSOCIATED SPECIES—MAMMALS, BIRDS, AND AMPHIBIANS

Greater Sage-Grouse as an Umbrella Species

GRSG populations require large landscapes and specific habitat conditions at broad scales to meet their seasonal life requisite requirements. Rowland et al. (2006) and Hanser and Knick (2011) provide evidence that GRSG habitats at broad scales have substantial overlap with habitats of other species similarly associated with sagebrush and sagebrush-steppe communities.

The plan amendment is specially designed to provide protections for GRSG and their habitats. Although individual species have specific habitat requirements at finer scales that differentiate their use of habitats, habitat protections for GRSG will benefit other species similarly dependent on these habitats. The structure of this biological evaluation reviews the efficacy for conservation and management actions for GRSG, and then evaluates the adequacy of these protections for other sensitive species, including those associated with sage-brush habitats

Because of the focus on GRSG and their habitats in the EIS, they were singled out and discussed separately above. Pygmy rabbit, Columbian sharp-tailed grouse, boreal toad, and Columbia spotted frog were grouped together for this analysis as they can occupy sagebrush habitats or habitats in broader sagebrush communities, such as aquatic systems. Though each of the species may not be completely dependent on sagebrush for every life history stage, for the sake of this analysis, they are grouped in this category and are called SAS. The reason for this was based on the potential impacts, the programmatic nature of the conservation measures, and landscape scale that is being analyzed. In addition, because the project is meant to amend forest plans to include regulatory mechanisms and conservation measures to protect sagebrush habitats for GRSG, the impacts would generally be similar for these species where habitat overlaps.

Pygmy rabbit (*Brachylagus idahoensis*)

Distribution—Pygmy rabbits occur in sagebrush systems in the primarily northwestern United States. The pygmy rabbit's historical range is portions of Washington, Oregon, Idaho, Montana, Wyoming, California, Nevada, and Utah. The species can be found in northern, western, and central Utah, where it prefers areas with tall dense sagebrush and loose soils (Green and Flinders 1980).

Habitat associations and threats—Pygmy rabbits are typically found in areas that include tall, dense stands of sagebrush (*Artemisia* spp.), and are highly dependent on sagebrush to provide both food and shelter throughout the year. During the winter the rabbits' diet consists of up to 99

percent sagebrush. In the summer and spring, their diet becomes more varied, including more grass and new foliage. The pygmy rabbit digs its own burrows, which are typically found in deep, loose soils. However, pygmy rabbits occasionally use burrows abandoned by other species and, as a result, may occur in areas of shallower or more compact soils that support sufficient shrub cover. Pygmy rabbits are active throughout the year and are most often aboveground near dawn and dusk. Inactive periods are spent in underground burrows. The species breeds during the spring and early summer, and females may produce a litter of approximately six young about thirty days after mating. Pygmy rabbits primarily eat sagebrush but also consume other vegetation. As its name implies, the pygmy rabbit is the smallest of all rabbits in in North America (Green and Flinders 1980). Loss of sagebrush that pygmy rabbits depend on for food and shelter is the main reason for the decline of its populations. Much sagebrush has been burned or converted to agriculture, and sagebrush is often cleared from large areas and replaced with exotic bunch grasses to improve livestock forage. Wildfires and invasive plants also threaten the rabbits' habitat (Larrucea 2007).

For the sagebrush associated species analysis, the pygmy rabbit has some of the most strict habitat associations and therefore acts as an umbrella species for the other species in this analysis. Affects to this species would be common to all.

Columbia sharp-tailed grouse (*Tympanuchus phasianus columbianus*)

Distribution—This subspecies presently occurs in British Columbia, Washington, Idaho, Montana, Utah, Wyoming, and Colorado; it has been extirpated from Oregon, California, and Nevada (Giesen and Connelly 1993). In Utah, sharp-tailed grouse ranged through central Utah to Piute County historically, but they are now limited to a remnant population in eastern Box Elder, Cache, and Morgan Counties (UDWR 2015).

Habitat associations and threats—Vegetative communities associated with historical and current distributions of Columbian sharp-tailed grouse are sagebrush steppe, mountain mahogany-oak scrub, fescue-wheatgrass, and wheatgrass-bluegrass, as well as riparian and mountain shrub communities containing deciduous shrubs, particularly serviceberry, snowberry, common chokecherry, and Gambel oak (Giesen and Connelly 1993).

Primary factors implicated in the decline of Columbian sharp-tailed grouse are the conversion of native rangelands to cropland, excessive livestock grazing, herbicide treatments, tree removal in riparian zones, conifer invasion, and urban development. Increasing human activities in the species' historic range is likely to continue habitat loss through additional excessive grazing, rangeland conversion to cropland, mineral exploitation, and residential development expansion and its associated recreation areas (summarized in Giesen and Connelly 1993).

Boreal toad (*Anaxyrus boreas boreas*)

Distribution—Boreal toads inhabit western Canada and much of the western (especially northwestern) United States. It is known to occur on National Forest System lands throughout most of Utah and is suspected to occur in additional areas. The overall range of the toad has contracted slightly, but its distribution in that range has been greatly reduced in the Intermountain Region, geographically isolating some populations, thereby causing them to be more susceptible to local extirpation (Rodriguez 2012).

Habitat associations and threats—The western toad, which is inactive during the winter, may either dig its own burrow in loose soil or use the burrows of other small animals. Adults feed on numerous types of small invertebrates, such as ants, beetles, and grasshoppers, whereas tadpoles

filter algae from the water or feed on detritus. Adults are dusky gray or greenish, with considerable dark blotching on the back and belly, and can usually be identified by a light-colored stripe along the back. The breeding season of the western boreal toad varies, depending on geographic location. Boreal toads are associated with a variety of habitats, including wetlands, forests, woodlands, sagebrush, meadows, and floodplains in the mountains and valleys. Usually they inhabit wetlands near ponds, lakes, reservoirs, rivers and streams. They require three main habitat components: shallow wetlands for breeding, terrestrial habitats with vegetative cover for foraging, and burrows for winter hibernation (Loeffler 2001). Boreal toads have a low reproductive output.

Threats to boreal toads chytrid fungus *(Batrachochytrium dendrobatidis)*, wetlands acidification, ozone layer thinning, timber harvesting that causes sedimentation, livestock grazing in and around riparian areas, pesticides and herbicides, and introduced species that prey on toads, create competition for resources, and are vectors for pathogens. Any activity that alters mountain wetland habitats can affect boreal toad populations.

Columbia spotted frog (*Rana luteiventris*)

Distribution—The Columbia spotted frog ranges from southeast Alaska through Alberta, Canada, and into Washington, Idaho, Wyoming, Montana, and disjunct areas of Nevada and Utah. In Utah, isolated Columbia spotted frog populations exist in the West Desert and along the Wasatch Front. Unfortunately, habitat degradation and loss have led to declines in many of these populations, especially those along the Wasatch Front, precipitating the inclusion of the species on the Utah Sensitive Species List. With a goal of recovering the Columbia spotted frog, several government agencies are cooperating under a conservation agreement to eliminate or significantly reduce the threats facing the species (Biotics Database 2005).

Habitat associations and threats—The Columbia spotted frog breeds as early in the spring as winter thaw allows, with eggs hatching in 3 to 21 days, depending on temperature. The species seems to prefer isolated springs and seeps that have a permanent water source, although individuals are known to move overland in spring and summer after breeding. During winter, spotted frogs burrow in the mud and become inactive. Adult frogs eat a wide variety of food items, ranging from insects to snails, whereas tadpoles eat algae, plants, and small aquatic organisms. The dorsal (back) coloration of the spotted frog ranges from light brown to gray, with varying degrees of spotting. Ventral (belly) coloration ranges from red to yellow (Biotics Database 2005). Threats are habitat loss and fragmentation, fish stocking in fishless ponds that are critical to frog reproduction, diseases transmitted by humans, livestock, and wildlife, and water quality degradation from pesticides, acid rain, fertilizers, and other chemicals (Smith and Keinath 2007).

7.2.1 Alternative A—No Action

Recreation/Travel Management

Alternative A would maintain current land management, and few Forests have specific conservation parameters in their land use plans for SAS. Under this alternative there would be no changes to the current National Forest System roads, transportation plan, or recreation management in the Forests relative to sagebrush. This alternative has the highest potential to impact SAS due to the lack of restrictions on activities that cause these impacts; therefore, all direct and indirect impacts on the species and their habitats would likely cause current trends to continue.

Fire

Sagebrush is killed by wildfires and recovery requires many years, especially in the case of large fires. Contiguous old-growth sagebrush sites are at high fire risk, as are large contiguous blocks of dead sagebrush. Pygmy rabbits prefer sagebrush sites with high cover, around 21 percent to 36 percent (Lee et al. 2010). Before recovery, these sites are of limited use to SAS, except along the edges and in unburned islands. As a result of this loss of habitat, fire has been identified as a primary factor associated with SAS population declines. Depending on the species and the size of a burn, a return to a full pre-burn community cover can take 13 to 100 years (Connelly et al. 2004).

Cheatgrass readily invades sagebrush communities, especially in drier, lower elevation areas, and disturbed sites after wildfire (Balch et al. 2013). Cheatgrass changes historical fire patterns by providing an abundant, continuous, and easily ignitable fuel source that facilitates rapid fire spread. While most sagebrush subspecies are killed by fire and are slow to reestablish, cheatgrass recovers within one to two years of a fire via seed in the soil.

Forest Service management to prevent or control wildfires can also affect SAS and habitat. Increased human activity and noise associated with fire suppression and prescribed fire in areas occupied by SAS could affect reproduction, hiding, or foraging behavior. Important habitats could be altered because of the use of heavy equipment, hand tools, and noise. In addition, suppression may initially result in higher rates of pinyon-juniper encroachment in some areas; in the initial stages of encroachment, fuel loadings remain consistent with the sagebrush understory.

Existing forest plans typically do not include specific management decisions for fuels treatments in sagebrush habitat. In general, both prescribed fire and non-fire fuels treatments are allowed, and fire suppression is prioritized to protect human life and specific resource values at risk. These policies would not avoid the use of prescribed fire in sagebrush habitat nor prioritize protection of sagebrush; thus, loss of habitat to wildfire and prescribed fire would continue.

Alternative A would have the fewest restrictions for fuels management actions and has a high potential for vegetation disturbance. As this alternative does not prioritize fire operations beyond what has already been determined in the fire management plans for the area, potential impacts are removing or degrading habitat, disrupting reproduction, changing species movement patterns due to areas devoid of vegetation, ultimately reducing habitat quality and quantity and negatively impacting SAS populations.

Invasive Weeds

Invasive weeds alter plant community structure and composition, productivity, nutrient cycling, and hydrology and may cause declines in native plant populations, including sagebrush habitat, through such mechanisms as competitive exclusion and niche displacement. Invasive plants reduce and, in cases where monocultures occur, eliminate vegetation that SAS use for food and cover. Invasive plant communities do not provide suitable SAS habitat, since the species in some way depend on sagebrush and a variety of native forbs and very often the insects associated with them. Pygmy rabbits depend on sagebrush, which they eat year-round and use nearly exclusively throughout the winter for food and cover (Keinath and McGee 2004).

Along with competitively excluding vegetation essential to SAS, invasive plants fragment SAS habitat or reduce habitat quality. Under current management (Alternative A), the Forest Service uses mechanical, manual, chemical, and biological control to reduce the likelihood of invasive weed spread and the extent of current infestations. Under Alternative A, the Forest Service would

continue to control noxious weeds and invasive species using integrated weed management actions, in cooperation with state and federal agencies, affected counties, and adjoining private landowners. There are no specific objectives in forest plans to focus these efforts on cheatgrass or sagebrush communities. These actions would benefit SAS habitat and other vegetation types but would not specifically prioritize management of these areas.

Conifer Encroachment

Pinyon-juniper woodlands may encroach onto sagebrush ecosystems, which reduces and may eventually virtually eliminate SAS occupancy in these areas. Pinyon-juniper invasion continually reduces shrub cover and shortens the season of available succulent forbs by depleting soil moisture (Crawford et al. 2004, p. 8). In higher elevation areas, Douglas-fir may also encroach onto mountain big sagebrush communities. The Forest Service manages pinyon-juniper encroachment, especially in previously treated areas, using mechanical and chemical control, hand-cutting, and prescribed burning, to reduce conifer encroachment onto sagebrush ecosystems.

Alternative A does not take any specific actions to prevent conifer encroachment, but many forest plans contain objectives for maintaining, improving, or restoring sagebrush plant communities often for big game winter range and livestock grazing. These approaches do not specifically address the threat of conifer encroachment to benefit SAS and thus would likely have limited effectiveness in limiting its spread.

Minerals and Energy Development

Energy development can result in direct habitat loss or degradation of important habitats by roads, pipelines, and power lines, and increase noise and direct human disturbance. The impacts of energy development often add to the impacts from other human development and may result in SAS population declines.

Nonrenewable (oil and gas) energy development impacts SAS and sagebrush habitats directly through disturbance and habitat loss from well pads, access construction, seismic surveys, roads, power lines, and pipeline corridors; it impacts SAS and their habitat indirectly from noise, gaseous emissions, changes in water availability and quality, and human presence. The interaction and intensity of impacts could cumulatively or individually lead to habitat loss and fragmentation in the long term (Connelly et al. 2004, 19 p. 41; Holloran and Anderson 2005, pp. 57-60). Recent work from developed natural gas fields in Wyoming (Gilbert and Chalfoun 2011) documents 10 to 20 percent declines in the abundance of the sagebrush obligates, sage sparrow and Brewer‘s sparrow.

Renewable energy facilities, including solar and wind power, typically require many of the same features for construction and operation as do nonrenewable energy resources. Therefore, impacts from direct habitat loss and habitat fragmentation through roads and power lines, noise, and increased human presence would generally be similar to those for nonrenewable energy development (USFWS 2010, pp. 13951-2).

Surface and subsurface mining for such mineral resources as coal, uranium, copper, and phosphate results in direct loss of habitat if it occurs in sagebrush habitats. Surface mining usually has a greater impact than subsurface activity. Habitat loss from mining can be exacerbated by storing overburden in undisturbed habitat. If infrastructure is necessary, additional direct loss of habitat could result from structures, staging areas, roads, railroad tracks, and power lines. SAS could be directly affected by trampling or vehicle collision and indirectly from an increase in

human disturbance, ground shock, noise, dust, reduced air and water quality, and changes in vegetation and topography (Wilson 2010, Lee et al. 2010).

Industrial activity associated with surface mine and infrastructure development could result in noise and human activity that disrupt the habitat and life cycle of SAS. Under this alternative, a small percentage of PHMA would be closed to nonenergy leasable mineral leasing, with almost all designated habitats open to leasing (including new lease expansion) with no cap. As such, Alternative A would cause the greatest amount of direct and indirect habitat loss or degradation, for SAS. There would likely also be greater negative impacts from noise, increased presence of roads and humans, and anthropogenic structures in an otherwise open landscape. Impacts from energy development on water quality and availability are especially important to sensitive amphibians, and some negative impacts are expected from Alternative A.

Infrastructure

Human disturbance is increased over the short term during infrastructure construction; in the long term, increased threats from predators perching on infrastructure may cause declines in SAS. Power lines are linear and often extend for many miles. Thus, ground disturbance associated with power line construction, as well as vehicle and human presence during maintenance, may introduce or spread invasive weeds over large areas, thereby degrading habitat.

Cellular and other communications towers could destroy SAS by inducing them to move away to avoid tall structures or electromagnetic radiation, or by providing perches for corvids and raptors (Connelly et al. 2004, p. 7). Impacts from roads may include direct habitat loss from road construction and direct mortality from collisions with vehicles. Roads may also present barriers to migration corridors or seasonal habitats.

Other impacts are facilitating predator movements, spreading invasive plants, and increasing human disturbance from noise and traffic (Forman and Alexander 1998, pp. 207-231). Closing and reclaiming unused, minimally used, and unnecessary roads in and around sagebrush habitats during seasonal use by SAS may reduce habitat loss (NTT 2011, p. 11).

Railroads have the same potential impacts on SAS as roads because they create linear corridors in sagebrush habitats, promoting habitat degradation and other disturbance. In addition, fence poles create predator perch sites and, potentially, predator corridors along fences (particularly if a road is nearby). Fences and their associated roads may allow for invasive weeds to invade or spread along the fencing corridor. Furthermore, fences may effectively fragment habitat, as SAS may avoid habitat around the fences to escape predation (Braun 1998, p.145).

Cross-country motorized recreation, even in winter, is very disturbing and destructive to SAS and would continue under Alternative A. Also, there would be no changes to the current approach to exchange, acquire, or dispose of lands or to permit ROWs on Forest Service-administered lands; all these lands would continue to be managed according to Forest Service policy and regulation. Permitted ROWs would continue to allow construction, maintenance, and operation, which may result in SAS habitat lossor degradation. Indirect impacts may include new infestations of noxious or invasive weeds and an increase in edge habitat. Though most project proponents would be forced to mitigate or minimize impacts, this alternative would likely have the greatest impact on SAS.

Livestock Grazing and Feral Horses

Livestock grazing may have both beneficial and detrimental impacts on sagebrush habitats, depending on site-specific management (USFWS 2010, p. 13998). Rangelands meeting forest plan standards may also provide effective wildlife habitat. However, grazing at inappropriate intensity, season, or location may degrade sagebrush ecosystems over the long term. It could change plant communities and soils, leading to loss of vegetative cover and plant litter, increased erosion, decreased water quality, and reduced overall habitat quality for wildlife, especially SAS (Knick and Hanser 2011; Connelly et al. 2004). The reduction of grass heights from grazing could reduce the suitability of cover and habitat availability by increasing exposure to predators. Livestock may also occasionally trample SAS (Coates 2007, pp. 28, 33) or disturb reproduction.

At the planning level, the Forest Service can decide whether areas would be open or closed to livestock grazing. Future impacts would be eliminated in areas closed to grazing, but past impacts would likely persist, and closing grazing may result in other harmful impacts, such as fuel buildup. At the implementation level, the Forest Service can consider changing grazing practices or systems, which could reduce grazing intensity or change the season of use, for example. In addition, changes in grazing management in riparian and wet meadows can reduce impacts in these important seasonal habitats and benefit sensitive amphibians.

Under Alternative A, the Forest Service would continue to make GRSG habitat available for livestock grazing. Active AUMs for livestock grazing would be 329,521 on BLM-administered lands and 265,373 on Forest Service-administered lands, though the number of AUMs on a permit may be adjusted during permit renewals, AMP development, or other appropriate administrative activity. Wild horse and burro AUMs would also remain at current levels.

These policies may degrade SAS habitat if current grazing practices are not meeting forest plan proper use parameters. Under Alternative A, there would be no change in the numbers, timing, or method of livestock grazing in the Forest. Other potential impacts on SAS habitat could be overgrazing; cover, structure, and diversity of vegetation reduction due to consumption; and meadow/wetland/spring/stream degradation; these habitats are crucial for amphibians.

7.2.2 Alternative B

Recreation/Travel Management

Under Alternative B there would be limited opportunities for road construction in PHMA, with minimum standards applied and no current roads upgraded. In addition, recreation permits would be given in PHMA only if there were a neutral or beneficial impact on GRSG and no cross-country travel would be permitted in PHMA. This is more restrictive than Alternative A, allowing fewer anthropogenic influences to sagebrush habitats and SAS by minimizing human use and road construction and upgrading. There would be negative impacts on SAS by displacing development and activities outside of PHMA by GHMA to other areas in the sagebrush ecosystem occupied by pygmy rabbits and sensitive amphibians.

Fire

Fire is among the greatest threats to sagebrush in Utah, especially to old growth sagebrush. Under Alternative B, fuels treatments in PHMA would be designed and implemented to emphasize protection of sagebrush ecosystems. Fuels management programs would consider GRSG habitat needs, and fire suppression would prioritize habitat protection after life and property. These policies would likely reduce the acres of sagebrush burned in wildfires or lost during fuels

treatment programs. As such, Alternative B's policies would protect SAS and habitat more than Alternative A. Sagebrush communities outside of GRSG habitat would likely not see the protection afforded to PHMA and GHMA and impacts on it would negatively impact pygmy rabbits and amphibians.

Invasive Weeds

Alternative B would likely protect more acres of sagebrush from invasive weeds because of the greater emphasis placed on sagebrush reestablishment than Alternative A, but focusing again only on GRSG habitat. However, the actual change in the probability of invasive weed establishment would depend on the resources available. Controlling noxious and invasive plants would benefit SAS in general.

Conifer Encroachment

Under Alternative B, invasive vegetation would be monitored and controlled in fuels treatment areas and in relation to PHMA. More emphasis on conserving sagebrush ecosystems than those described under Alternative A would generally benefit SAS.

Minerals and Energy Development

Under Alternative B, lands in PHMA would be closed to nonenergy leasable mineral leasing and to mineral material sales, including not permitting existing mine expansion. This action would greatly reduce the acreage open to mineral leasing compared to Alternative A; also, the policies would reduce the acreage affected by energy development in the planning area compared to Alternative A, by limiting the impacts of energy development, including disturbance and habitat degradation. This alternative would provide protection now and into the future for the most important GRSG habitats, which would encompass many acres of SAS habitat. Though this alternative may push energy and mineral development to less desirable sagebrush or non-GRSG habitat, there may be negative impacts of not protecting all SAS habitat.

Infrastructure

Under Alternative B, PHMA would be exclusion areas for new ROWs, and the acreage excluded from ROW construction would be greatly increased over Alternative A. These policies would protect PHMA from ROW and road construction more than Alternative A. PHMA would be managed as an exclusion area and general habitat would be managed as an avoidance area for new ROW projects. This benefits SAS where habitat with GRSG overlaps, but it may increase negative impacts outside of GRSG habitat in other sagebrush communities suitable for or occupied by SAS.

Livestock Grazing and Feral Horses

Alternative B would not reduce acres open to livestock or feral horse grazing, nor would it reduce AUMs per se; however, in PHMA, the Forest Service would incorporate GRSG habitat objectives and management considerations into grazing allotments through AMPs or permit renewals. Alternative B would adjust grazing direction in GRSG PHMA. This accounts for less than 10 percent of the land cover of the National Forests in Utah. The potential impacts due to livestock grazing, vegetation disturbance, and range improvements would be the same under Alternative B as it would be under Alternative A, except that it would provide a few more restrictions to protect some SAS habitat. Though this would occur at a very small scale, some impacts on local

populations would likely prove beneficial, especially where water quality and springs and wetlands were improved for amphibians.

7.2.3 Alternative C

Recreation/Travel Management

Impacts would be similar to those described under B except in PHMA camping and other non-motorized recreation would be prohibited during certain seasons within 4 miles of a lek. In addition, there would be no new route construction within 4 miles of a lek, thereby reducing disturbance to SAS within these areas in comparison to alternatives A and B.

Fire

Alternative C would follow the same policies as Alternative B, with the additional provision that livestock would be excluded from habitat areas post-fire to allow for recovery. As with Alternative B, these policies would prioritize sagebrush preservation more than current management under Alternative A and thus would conserve more SAS habitat. Alternative C would have the most protective measures for SAS.

Invasive Weeds

Alternative C would follow the same approach as Alternative A and B, using integrated vegetation management to control, suppress, and eradicate noxious and invasive plants. As under Alternative B, vegetation management would prioritize sagebrush reestablishment and noxious weed control. In addition, Alternative C would develop methods for prioritizing and restoring sagebrush steppe invaded or even once reseeded by nonnative plants. These policies would place greater emphasis on sagebrush reestablishment than Alternative A and would be generally beneficial to SAS.

Conifer Encroachment

Impacts from conifer encroachment under Alternative C would be the same as those described under Alternative B, but with emphasis on a wider range of GRSG habitats focusing on sagebrush communities in general and benefiting SAS, more than Alternative A and more similar to Alternative D.

Minerals and Energy Development

Under Alternative C, lands in all GRSG-occupied habitat would be closed to nonenergy leasable mineral leasing and to mineral material sales, including not permitting mine expansion. This action would greatly reduce the acreage open to mineral leasing. Under Alternative C, proposed policy changes would be the same as those described for Alternative B; however, they would have greater impacts because they would be applied to all occupied habitat. Lands in PH and GH would also be defined as unsuitable for surface exploration of coal and would be proposed for withdrawal from locatable mineral entry. Unleased areas would be closed to fluid mineral leasing, greatly increasing the extent of habitat protected from energy development. Conservation measures, including NSO stipulations, would be applied to existing lease areas. These policies would substantially reduce the available acreage for energy development, which would limit impacts, such as disturbance and habitat degradation. Under Alternative C, impacts would be similar to those described under Alternative B, except they would be more restrictive, increasing

habitat effectiveness for SAS, except outside GRSG habitat where impacts are the same as Alternative A.

Infrastructure

Under Alternative C, all occupied GRSG habitat would be exclusion areas for new ROWs; the acreage excluded from ROW construction would be greatly increased over Alternative A. These policies would protect SAS habitat from ROW and road construction more than Alternatives A, B, D, or E. Limiting infrastructure construction would reduce the risks posed by roads and transmission lines as well as degradation of habitat.

Livestock Grazing and Feral Horses

Alternative C1

Under Alternative C1, livestock grazing would be closed in GRSG habitat. This change would avoid direct impacts of grazing, such as herbaceous cover loss, erosion, and diminished water quality. However, removing livestock grazing may eventually lead to increased fuel loading in the way of fine flashy dry vegetation in late summer. Wild ungulates and wild horses would still be using these areas and their use may also increase as available forage increases. Completely removing livestock grazing could improve sagebrush habitat quality initially and help to restore important wetland and adjacent riparian habitats that support SAS, especially amphibians.

Alternative C2

Alternative C2 would reduce acres open to livestock grazing and limit AUMs in allotments that overlap GRSG habitats. This alternative would also reduce wild horse AUMs by 25 percent. These policy changes would reduce the direct impacts of grazing from Alternative A, while maintaining the vegetation diversity and fuels reduction promoted by livestock grazing. Not exceeding proper use grazing levels, according to forest plan standards, would be more easily attainable if proposed grazing reductions were followed. Wild ungulates would still be using these areas, which could also increase as available forage increases. The reduction of livestock and feral horse grazing could improve sagebrush habitat quality and help to restore important wetland and adjacent riparian habitats that support SAS. There would be few if any negative impacts on SAS under Alternative C with respect to range resources. Additionally, under this alternative, only those habitat treatments would be allowed that benefit GRSG. Therefore, Alternative C would have the fewest negative impacts and the most positive impacts on SAS.

7.2.4 Alternative D

Recreation/Travel Management

Under Alternative D, the impacts of most suggested management actions would be similar to Alternative B; the exception would be more flexibility or discretion given to the land management agency for site-specific analysis. This would allow for example, route construction in PHMA, road improvements, and special use permits issued if it is determined that these actions would not adversely affect GRSG. Under this alternative if populations and habitats are healthy or improving, it could permit disturbance above the 5 percent cap of disturbance for the Utah management zone. Impacts of this alternative include continued disturbance of some SAS habitat that does not overlap GRSG and some disruption of normal life history behaviors if disturbance were permitted in PHMA/GHMA.

Fire

Alternative D's impacts would be similar to Alternative B. In addition, fuel breaks would be constructed to protect large blocks of sagebrush habitat. Fuels management programs would include GRSG habitat needs, and grazing management would be considered as a tool to reduce fuel loading. These policies would be likely to reduce the acres of sagebrush burned in wildfires or lost during fuels treatment programs. As such, they would protect GRSG habitat from fire more than Alternative A. This alternative would be more protective than Alternative A but less protective than Alternatives B and C for SAS.

Invasive Weeds

Alternative D would follow the same approach as Alternative B, using integrated vegetation management and prioritizing sagebrush reestablishment and noxious and invasive weed control. In addition, as under Alternative C, Alternative D would develop methods for prioritizing and restoring sagebrush steppe invaded by nonnative plants. These policies would place greater emphasis on sagebrush reestablishment than Alternative A.

Conifer Encroachment

Under Alternative D, vegetation management programs would include treating PHMA facing conifer encroachment in order to meet GRSG habitat objectives to reduce conifer encroachment in PHMA. Because this alternative has a specific goal of reducing conifer encroachment to protect GRSG habitat, it would likely be more effective in lowering pinyon-juniper spread than Alternative A and would likely generally benefit SAS.

Minerals and Energy Development

Under Alternative D, lands in PHMA would be closed to nonenergy leasable mineral new leasing and mineral material sales, including not permitting mines to expand. This action would greatly reduce the acreage open to mineral leasing, compared to Alternative A. Unleased areas in PHMA and GHMA would be open to fluid mineral leasing, but all acres would require NSO or CSU stipulations, where, under Alternative A, over 1 million acres have no stipulations. Conservation measures, including NSO stipulations, would be applied to existing lease areas. However, Alternative D is more similar to Alternative B regarding energy development, using stipulations to protect GRSG compared to Alternative A; as a result, impacts on GRSG from energy development as described under Alternative A would be reduced. Under this alternative, PHMA would be closed to new fluid mineral leases, and existing leases would have a 4-mile NSO buffer around leks similar to Alternative B. However with some mineral development, this alternative would allow up to 5 percent disturbance in any Utah management zone. Impacts would be similar to those associated with Alternative B. There may be a few more impacts if the disturbance allowance is increased from 3 percent to 5 percent. However the potential for this difference to have negative impacts on SAS is minimal. Therefore impacts would be most similar to those described under Alternative B, including displacing energy and minerals development to SAS habitats that do not overlap GRSG.

Infrastructure

Limiting infrastructure construction would reduce the risks posed by roads and transmission lines, such as increased predation and habitat degradation. Under Alternative D, PHMA within 4 miles of an occupied lek would be exclusion for most types of new ROWs. These proposed policies would protect PHMA from ROW and road construction more than Alternative A by limiting it in

habitat areas. Although Alternative D would provide less protection to PHMA from ROW construction, it would restrict development more than Alternative A, while allowing for increased management flexibility to improve the effectiveness of protection measures. Alternative D is generally the same as Alternative B, except that the potential for direct habitat loss and indirect impacts would be greater compared with both Alternatives B and C. This is due largely to the 5 percent disturbance cap and allowance for development to occur in PHMA (open for development). As such, Alternative D would provide fewer protective measures than Alternatives B and C to SAS where range and habitats are coincident with PHMA, but more than Alternative A.

Livestock Grazing and Feral Horses

Alternative D would not reduce acres open to livestock or feral horse grazing, nor would it reduce AUMs. Impacts would be similar to Alternative B, but under Alternative D the Forest Service would incorporate GRSG habitat objectives and management considerations into grazing allotments in PHMA. Other actions are similar to Alternative B, and as GRSG objectives are added to grazing permit renewals, habitat quality would improve over the long term. Alternative D would be similar to Alternative B but would be slightly more restrictive; this is because GRSG habitat objectives in grazing allotments would be applied to occupied habitat not just PHMA. This alternative would have much fewer negative impacts than Alternative A but slightly more than Alternative C on SAS. Generally speaking, if GRSG habitat were taken into consideration before the management action, then SAS would likely benefit from that protection or management action, though some additional SAS habitat is still at risk because it is outside of GRSG habitat.

7.2.5 Alternative E

Alternative E2—the Wyoming Governor's Executive Order. Where noted, E2 applies to those Ashley National Forest lands in Wyoming and is discussed in seven resource areas below.

Recreation/Travel Management

Under this alternative, impacts to SAS within GRSG nesting and winter habitats would be decreased because routes would be limited in these areas. Areas of GRSG habitat in SGMAs/core areas with nesting and winter habitat that do not have designated routes in a Travel Management Plan would be designated as limited to existing routes. This would reduce cross-country access in those areas, but would occur across a smaller area than under Alternatives B or D. Management under Alternative E would include permanent, seasonal, and time-of-day limitations on activities within 1 mile of occupied leks if the activity disrupts GRSG nesting and brood rearing. Areas of GRSG habitat in SGMAs/core areas with nesting and winter habitat that do not have designated routes in a Travel Management Plan would be designated as limited to existing routes. This would reduce cross-country access in those areas, but would occur across a smaller area than under Alternatives B or D. Outside of these areas, dispersed recreation and developed recreation sites would have impacts to SAS similar to Alternative A.

Fire

Under Alternative E, a statewide fire agency agreement would be created to eliminate jurisdictional boundaries and allow for immediate response to natural fire in SGMA and core areas. It would allow the use of fire-retardant vegetation to buffer areas of high quality GRSG

habitat from catastrophic fire. Prescribed burns would be used with caution in sagebrush habitat. These policies would be more likely to reduce the acres of sagebrush burned in wildfires or lost during fuels treatment programs, compared to Alternative A, and generally would benefit SAS.

Invasive Weeds

Under Alternative E, interagency focus groups—likely according to respective GRSG population areas—would respond to new infestations to control invasive species. Additionally, containment of known infestations in or near sagebrush habitats would be a high priority for all land management agencies. These actions would focus invasive species control on GRSG habitat more than Alternative A, and impacts would be generally positive for SAS.

Conifer Encroachment

Under Alternative E, vegetation management programs would include aggressive treatment to remove encroaching conifers and other plant species. This would expand GRSG habitat or increase the carrying capacity and effectiveness of habitat areas. Because Alternative E has a specific goal of reducing conifer encroachment to protect GRSG habitat, it would likely be more effective in lowering the probability of pinyon-juniper spread than Alternative A and generally would be beneficial to SAS.

Minerals and Energy Development

Selection of Alternative E would place a 1-mile NSO restriction around occupied GRSG leks for fluid mineral development. This would reduce disturbance from oil and gas development on nesting habitat close to the lek. However, exceptions to this NSO would be granted if the developments can be placed out of the line-of-sight of GRSG in the lek. Alternative E would not close any lands to mineral material sales or nonenergy mineral leasing; however, it would limit impacts from mineral leasing and development through the use of conservation measures, such as seasonal timing restrictions, and BMPs to minimize disturbing GRSG.

In habitat outside SGMA no specific management actions would be taken. Coal leases in SGMA would be allowed, provided special conditions, conservation measures, and pre-project mitigation requirements were met. Similarly, areas not presently petitioned for withdrawal from locatable mineral entry would remain open, but conservation measures would be applied to claimants. Unleased areas in SGMA and core areas would remain open to oil and gas leasing under NSO buffers (1 mile from leks in SGMA and 0.6 mile in core areas) and stipulations for CSU and timing. Existing lease areas would remain under current management. These policies would reduce the acreage open to energy development without stipulations compared to Alternative A. Alternative E would provide some protection to SAS where the species are coincident with GRSG, but impacts would be similar to Alternative A overall.

Infrastructure

Limiting infrastructure construction would reduce the risks posed by roads and transmission lines, such as predation, collision, and habitat degradation. Under Alternative E1, SGMA would be avoidance for new ROWs; under Alternative E2 new ROWs would be excluded in core areas. No specific management actions are provided for areas outside SGMA, though non-core areas would be avoidance areas. These proposed policies provide limited measures to protect habitat in SGMA and core areas from ROW and road construction. They would reduce impacts compared to Alternative A on SAS only where the species are coincident with SGMA.

Livestock Grazing and Feral Horses

Alternative E would not reduce acres open to livestock or feral horse grazing, nor would it reduce AUMs. Rangeland BMPs would be used on existing grazing operations to increase the necessary vegetation to improve nesting success and population recruitment for GRSG. To limit impacts on nesting and lekking areas, the intensity and timing of grazing in sagebrush habitats would be controlled. Alternative E may improve SAS habitat quality on grazing lands over the long-term through use of BMPs, but it does not go as far to protect and enhance habitat for SAS as the other action alternatives.

7.2.6 The Proposed Plan

Recreation/Travel Management

Under The Proposed Plan, the impacts to SAS of most suggested management actions would be similar to Alternative B and D in relation to recreational activities. In PHMA, only allow special recreation permits (SRPs) that have neutral or beneficial effects to GRSG and their habitat. Existing SRPs would be evaluated for adverse effects to GRSG and their habitat, and subsequently modied or cancelled as appropriate and where possible to avoid or mitigate effects of habitat alterations or other physical disturbances to GRSG (e.g., breeding, brood-rearing, migration patterns, or winter survival). In PHMA, discrete anthropogenic disturbances, whether temporary or permanent, would be managed so they cover less than 3 percent of Biologically Significant Units and proposed project analysis areas. The 3 percent disturbance cap would apply to new roads constructed to access existing ROWs. Routes would be evaluated for seasonal closure to reduce habitat loss and degradation. The overall travel network would be managed to minimize impacts on GRSG. The impacts of this alternative are continued disturbance of some SAS habitat that does not overlap GRSG, along with some disruption of normal life history behaviors if disturbance were permitted in PHMA or GHMA.

Fire

The Proposed Plan is similar to Alternative B, but design criteria for fire and fuels activities would apply to GHMA in addition to PHMA. Due to the greater area of applicability, benefits would be greater overall to SAS, where populations and habitats overlap with GRSG habitats. Implementing the criteria would reduce but not eliminate direct and indirect impacts on SAS habitats, other fire-prone vegetation communities, or areas targeted for fuel treatments. Impacts would likely be less than Alternatives A and B because of fewer acres burned.

For Columbian sharp-tailed grouse, fewer acres burned would have mixed outcomes because fire has been reported to both improve and to damage sharp-tailed grouse habitat. Some vegetation components, such as deciduous shrubs, can recover quickly when burned, while sagebrush takes much longer. Sharp-tailed grouse will use cleared areas surrounded by dense brush, while other burned areas may receive less use. Sharp-tailed grouse may benefit from using burned areas that were previously thick stands of sagebrush, whereas fire in lek sites may cause them to be abandoned, or the grouse may return to previously abandoned sites (summarized in Greer 2010). Pertaining to fire, management actions and related impacts under The Proposed Plan would be similar to those described under Alternative B and D, but it has the addition of more specific objectives for GRSG habitat and refined protocols for developing site-specific management.

Invasive Weeds

The Proposed Plan would follow a similar approach as Alternatives C, D, and E, using integrated vegetation management and prioritizing sagebrush reestablishment and noxious and invasive weed control. The Proposed Plan is similar to Alternatives C, D, and E in that an additional provision would be developed and methods implemented to prioritize and restore sagebrush steppe in PHMA invaded by nonnative plants. This places greater emphasis on habitat restoration in PHMA, not found under Alternatives A or B.

Conifer Encroachment

Unlike Alternatives A, B, and C but similar to Alternative D, the Proposed Plan includes provisions that would specify the extent of conifer encroachment to maintain and expand GRSG habitat by decade. The long-term impact is likely beneficial where SAS habitats overlap with GRSG habitats, due to increased grass, forb, and shrub availability.

Minerals and Energy Development

Under The Proposed Plan, lands in PHMA would be closed to new leasing of mineral material sales. New coal and fluid mineral leases would be allowed, but a NSO stipulation would apply in PHMA. Conservation measures to reduce or mitigate impacts on GRSG habitat in PHMA would apply to existing leases. This would considerably reduce new ground disturbances associated with surface mining and other surface mineral extractions, compared to Alternative A. Ground disturbances under this alternative would be less but would not eliminate direct and indirect impacts on SAS because of past and ongoing disturbances. The 3 percent threshold on anthropogenic disturbance would contribute to the reduction of potential impacts, as compared to Alternatives A and D.

Similar to Alternative D, the Proposed Plan incorporates specific conservation measures or stipulations to minerals and energy extraction to mitigate impacts and protect habitat in both PHMA and GHMA. Under the Proposed Plan, impacts on SAS would be similar to, but more protective than, those described for Alternative A.

Infrastructure

As described above for GRSG, PHMA would be managed as avoidance areas for new ROWs, unless the proposal could demonstrate a net conservation gain to GRSG habitat and includes application of RDFs and other GRSG conservation strategies (e.g., tall structure limitations and lek buffers) to reduce impacts on GRSG habitat. Limiting infrastructure construction would reduce the risks posed by roads and transmission lines, such as increased predation, collision, and habitat degradation. This would provide long-term benefits to Columbian sharp-tailed grouse and pygmy rabbit where their habitats overlap with GRSG habitat. Under the Proposed Plan, PHMA within a range of 1.2 to 5 miles of an occupied lek would be exclusion for new elevated infrastructure, with buffers varying by infrastructure type. Buffer distances are based on best available science (Manier et al. 2014) and would be calculated in accordance with the Buffer Appencix in the FEIS. Buffer distances under Alternative D also vary by infrastructure type and range from 1 to 4 miles from occupied leks.

The Proposed Plan would reduce impacts of infrastructure on SAS in buffered areas, but it may shift those impacts to habitats outside buffered areas. In PHMA, new structural range improvements would be designed to have a neutral impact or to conserve, enhance, or restore GRSG habitat through an improved grazing management system. Policies proposed under this

alternative would protect PHMA from ROWs, structures, and road construction more than Alternative A, by limiting road and ROW construction and range management structures in habitat areas. The Proposed Plan is generally the same as Alternative B. It would limit the potential for direct habitat loss due to infrastructure better than Alternative D. This would be largely due to the 3 percent disturbance cap in PHMA, thereby reducing impacts on SAS where habitats overlap with GRSG habitats.

Livestock Grazing and Feral Horses

Similar to Alternatives A, B, D, and E, the Proposed Plan would maintain AUMs under current management; however, it would provide direction to modify grazing management in order to meet PHMA objectives and would maintain, enhance, or improve desired GRSG habitat. Units would be modified through the permit renewal process or other appropriate actions. The Proposed Plan would also make SFA a priority for evaluating permit renewals. In addition, this alternative includes restrictions on new permanent livestock facilities, fences, sheep bedding and camps within 1.2 miles of active/occupied leks.

In PHMA, impacts on SAS under the Proposed Plan would be similar to Alternatives B and D. By comparison, this would likely reduce the impacts of grazing on SAS that would occur under Alternative A. This is because of the provisions designed to protect or enhance GRSG habitat. However, the Proposed Plan does not reduce impacts of grazing to the extent provided under Alternative C, which proposes to substantially reduce livestock grazing in GRSG habitat.

Under this alternative, direct and indirect impacts on sensitive plants in GHMA would be similar to those described for Alternative A, except when the plants are in proximity to occupied leks. Here, additional restrictions or mitigations would apply for new permanent livestock facilities, fences, sheep bedding, and camps within 1.2 miles of any occupied leks.

Summary

Impacts on SAS and their habitats due to any of the action alternatives would be generally beneficial due to reduced anthropogenic influences on sagebrush habitats that overlap GRSG. Overall, the highest potential for negative impacts would be from Alternative A; however, the riparian protection measures in the various forest plans should provide adequate protection for those species that depend on aquatic/riparian habitats. That said, Alternative A does not have the regulatory mechanisms or assurances specific to GRSG habitats to the extent desired. Under the No Action Alternative (A), incremental, small-scale negative impacts are more likely. Conversely, there would likely be beneficial impacts on SAS as a result of implementing any of the action alternatives, but only in areas classified as GRSG habitat. Although Alternative C takes a more aggressive blanket approach to GRSG occupied habitat, especially by eliminating grazing, Alternatives B and D would also provide greater protections to SAS habitats than would Alternative A. Though Alternative E has protective measures for GRSG, they are generally less conservative in terms of acres protected than other action alternatives. There would be negative impacts on SAS from the action alternatives as anthropogenic activities are displaced from GRSG habitat onto other areas of the Forest, especially other areas of the sagebrush ecosystem. Strategies that maintain large contiguous stands of old growth sagebrush with 24 to 36 percent canopy cover would benefit pygmy rabbits the most; strategies that maintain high water quality and protect wetlands, streams, and springs from impacts would benefit amphibians the most. Differences in negative impacts between action alternatives would be negligible, and likewise, differences in positive impacts would be difficult to discern at this scale.

7.2.7 Cumulative Effects for Sagebrush-Associated Species

Detailed discussion of cumulative effects methodology, analysis, and conclusions for species other than GRSG, including *Other Special Status Species* and *Fish and Wildlife* in general are provided in Chapter 5 of the FEIS, herein incorporated by reference (USDI Bureau of Land Management and USDA Forest Service. 2015. Utah Greater Sage-Grouse, Final Land Use Plan Amendment and Environmental Impact Statement). Conclusions presented in the FEIS are summarized below.

Cumulative Effects Conclusion Summary

Many past and present actions and conditions within the cumulative impact analysis area have affected and will likely continue to affect other species. Reasonably foreseeable future actions that may affect other special status species include noxious weed treatments, conifer encroachment control efforts, and sagebrush habitat restoration projects. State and local efforts to protect GRSG include habitat improvement projects on state and private lands. These improvement efforts would expand the extent and increase the quality of habitat for many fish and wildlife species that inhabit sagebrush ecosystems; however, these gains would be supplanted, at least in part, by impacts resulting from energy development, especially oil and gas development in the Uintah and Carbon population areas. Additionally, future actions including transmission line construction and mineral development are expected to reduce available habitat for fish and wildlife species.

Management under Alternative A would have the greatest cumulative impacts on other species. Management under the action alternatives would include limitations on surface disturbing activities, such as ROW and mineral development, therefore reducing the potential for long-term cumulative impacts on species' habitats. Such activities would likely be pushed to nonfederal lands or to federal lands outside of mapped occupied GRSG habitat, which would incur some level of disturbance and loss of other special status species' habitat in those areas.

7.3 PLANTS

Aquarius paintbrush *(Castilleja aquariensis)*

Aquarius paintbrush is a perennial herb that occurs in dry open meadows, silver and high-elevation sagebrush/forb communities, interspersed with spruce/aspen forests. Elevations for the species range between 9,150 and 11,300 feet. Aquarius paintbrush is endemic to the upper elevations of the Aquarius Plateau and Boulder Mountain of south-central Utah, with known populations in Garfield and Wayne Counties.

The number of occurrences is unknown but is believed to be less than 40, with a total population estimated at about 45,000 individual plants. Most populations of the species are found on Forest Service-administered lands. The population trend typically fluctuates but appears to be stable to downward. Aquarius paintbrush is ranked imperiled in Utah (G2S2). Grazing livestock, especially sheep, is the most imminent threat to the species. Where cattle graze, Aquarius paintbrush populations have also shown decline. Other threats or cumulative actions are site-specific disturbance from road construction and maintenance, ORV use, noxious weed invasion, and insect infestations.

Logan buckwheat *(Eriogonum loganum)*

Logan buckwheat is a perennial herb that occurs in sagebrush/bunchgrass and rocky outcrop communities of northern Utah (Cache, Morgan, Rich Counties) and extreme southern Idaho (Franklin County). It is found at elevations ranging from roughly 4,800 to 6,700 feet. The plant is endemic to Utah and Idaho. The number of occurrences, population size, and trend are unknown. The species is ranked as imperiled in Utah (G2S2). Threats or other cumulative actions are noxious weeds and possible highway expansion in a known population site (NatureServe 2013).

Stemless beardtongue *(Penstemon acaulis)*

Stemless beardtongue is a diminutive, mat-forming, long-lived perennial herb. It occurs in mixed desert shrub, black and Wyoming big sagebrush (rarely in well-developed communities of Wyoming big sagebrush), and pinyon-juniper. The plant is found in greater abundance and vigor in disturbed areas, such as seldom used roadways, abandoned gravel quarries, and road cuts, and is less common in native shrub communities. Elevations for the plant range between 5,500 and 8,200 feet; it is endemic to Utah and Wyoming but most occurrences and populations are found in Utah. Population trend is relatively unknown but appears stable.

About 25 occurrences of stemless beardtongue are documented. The species is ranked imperiled (G2), and is considered critically imperiled in Utah and Wyoming (S1). Total population is estimated in the hundreds of thousands of individuals (Jouseau 2012). Threats or other cumulative actions are gravel quarrying; road construction, maintenance, and use; recreation in and around Flaming Gorge Reservoir; buildings; ORVs; collections for horticulture, and livestock trampling. Due to its diminutive form, domestic and wild ungulate foraging is not considered a threat (Goodrich 2007; Jouseau 2012).

Little penstemon (P. parvus*)*

Little penstemon is a perennial herb that occurs in dry open meadows, silver and high-elevation black sagebrush communities on tertiary volcanic gravels or rocks. Elevations for the species range between 8,200 and 11,500 feet. Little penstemon is endemic to south-central Utah with known populations in Garfield, Piute, Sevier, and Wayne Counties.

Between 6 and 20 occurrences of the species are known, with populations often described as frequent to common. Little penstemon is ranked imperiled in Utah (G2S2), and the Population estimates and trend are unknown. Threats or other cumulative actions are excessive livestock grazing, roads, recreation, and potential reclamation projects that have not been specified.

Arizona willow (Salix arizonica*)*

Arizona willow is a shrub that typically grows in wet sub-alpine meadows, along low gradient stream banks, and in wet areas of seeps and springs. The shrub is typically associated with a sub-alpine coniferous forest matrix but may grow in wet areas next to high elevation sagebrush communities. Elevations for the species range between 8,300 and 11,600 feet. It is known to occur in on the high plateaus of south-central Utah but also in New Mexico, Arizona, and Colorado.

Arizona willow is ranked globally imperiled (G2). It is ranked imperiled in Utah and Arizona (S2) and is ranked critically imperiled in New Mexico and Colorado (S1). Between 60 and 100 occurrences of the willow have been documented in four states, with most on Forest Service-administered lands. Total population size is estimated between 22,000 and 55,000 individuals,

with the largest populations occurring in Utah. The larger Utah populations are considered stable, though many smaller populations in Utah and other states show decline. The primary threats are browsing by wild and domestic ungulates (primarily elk and cattle) and hydrologic changes (diversions and impoundments; Decker 2006; Maschinski 2001). Other threats or cumulative actions are timber harvesting, road construction, recreation, disease, and possibly climate change.

Uinta greenthread *(Thelesperma pubescens)*

Uinta greenthread is a perennial herb that occurs on sparsely vegetated ridge crests consisting of grasses, cushion plants, and scattered sagebrush. Its habitat is often situated above communities of mountain mahogany and sagebrush. It grows in shallow gravelly or cobbled soils of the Bishop Conglomerate Formation. Elevations for the species range between 8,000 and 9,000 feet. It is a narrow endemic in the vicinity of Hickey Mountain, near the toe of the north slope of the Uinta Mountains. The species occurs in Wyoming and possibly in Utah.

There are four known occurrences of Uinta greenthread in Wyoming and none in Utah. The estimated population of the species is around 200,000 plants, and the population trend is stable. Uinta greenthread is ranked globally imperiled (G2) and is critically imperiled in Wyoming and Utah (S1). Threats or other cumulative actions are road construction or expansion, oil and gas exploration, timber harvest, all-terrain vehicle use, noxious weeds, and expansion of an existing radio tower.

7.3.1 Alternative A—No Action

Under Alternative A, current management actions in both PHMA and GHMA would remain constant; conditions and trends for sensitive plants and their habitat would remain unchanged. Direct impacts on sensitive plants are grazing and trampling; indirect impacts are ground disturbances in all forms and origins and the spread of invasive species (these impacts are listed in the species information paragraphs above). The direct, indirect, and cumulative effects for Alternative A are further discussed under the seven disturbance headings below.

Recreation/Travel Management

Alternative A would maintain current land management; however, few Forests have specific conservation parameters in land use plans for sagebrush habitats.

Under this alternative there would be no changes to the current National Forest System roads, transportation plan, or recreation management in the Forest relative to sensitive plants associated with sagebrush habitats. There would be minimal seasonal restrictions on casual use, and some of the areas in GRSG habitat would remain open to cross country travel, especially in winter. Aquarius paintbrush, little penstemon and Arizona willow occur in high elevation habitats, but only Arizona willow may be damaged from over-snow vehicle use because its branches may be exposed above the snow or close enough to the snow surface to be susceptible to breakage by snowmobiles.

The sensitive plant species in this analysis are endemics with relatively small populations and limited distributions. Under Alternative A, some current and foreseeable actions may lead to undesirable impacts at a smaller scale for some sensitive species. For example, stemless beardtongue populations and habitat were lost during the filling of Flaming Gorge Reservoir, and possible threats include gravel quarrying and recreation facility construction or expansion (Jouseau 2012). Uinta greenthread has a very small distribution but may be impacted by road construction and all-terrain vehicle use. Road construction or maintenance and recreation

activities are also identified as threats to Aquarius paintbrush, Logan buckwheat, little penstemon and Arizona willow. Indirectly, roads and recreational activities are often correlated with the spread of noxious weed species and other nonnative invasive plants, and all of these sensitive plants could be negatively impacted increased weed infestations. This alternative has the highest potential to impact sensitive plants due to the lack of restrictions on activities that cause these effects.

Direct and indirect effects to all six sensitive plants from travel management and recreational uses would result in continued trends, which are currently unknown, stable, or declining.

Fire

Under Alternative A, national forests would continue to implement policies and guidelines that manage both wild and prescribed fires. Prescribed fire, and in some cases, wildland fire have been specifically used to manipulate or alter selected habitat or vegetation communities for various reasons, but land use plans neither specify the use of fire to enhance nor the suppression of fire to protect sensitive species habitat.

Impacts of fire vary by plant species and its habitat. Habitats for stemless beardtongue and Uinta greenthread rarely carry fire and have fire intervals that span decades. On the other hand, fire is relatively common in montane or high-elevation sagebrush. Fire intervals for these communities typically range between 20 and 45 years. Most perennial forbs in higher elevation sagebrush communities demonstrate at least a temporary benefit following fire because they grow in a fire-dependent system.

Little penstemon, Aquarius paintbrush, and Logan buckwheat grow in montane or high-elevation sagebrush. Tait (2013)[3] reported little penstemon growing in burned habitat following fire, but no data exists to determine decline or increase in populations following that event. Decker (2006) predicted that small populations of Arizona willow may be affected by a catastrophic fire. She reasoned that since willow habitat is found in spruce/fir forests that have increased fuel loading due to historic fire suppression, a catastrophic fire, although rare, could increase erosion and sedimentation that would affect the hydrology of Arizona willow habitat. The impact of fire on Arizona willow is unknown since no events have been observed or documented.

In conclusion, the direct and indirect impacts of fire on sensitive plants and their habitat would likely cause current trends to remain constant. However, since the impacts of fire on sensitive plants under evaluation are not well understood, except for assumptions made on known fire interval ranges in known plant habitats, fire is not fully evaluated as a cumulative effect.

Spread of Weeds

The establishment and spread of invasive plant species on Forest Service-administered lands in Utah is ongoing. Noxious weed data from National Forests indicate that most new infestations are located along roads and trails and at campsites and sites for recreation, energy exploration, and mineral extraction. These sites are accessible by motor vehicles and are most frequented by

[3]D. Tait, Botanist, Fishlake National Forest. Richfield, Utah. Personal communication. Bruce Davidson, USFS Botanist, Enterprise TEAMS Unit. April 10, 2013.

humans. In some cases, fire and other land disturbances may facilitate the establishment and spread of noxious weeds.

The number and magnitude of these cumulative effects correlate closely with the establishment and spread of noxious weeds. Invasive species are capable of altering vegetation composition, structure, and productivity; fire frequency; and hydrologic function. National Forest land use plans provide an integrated approach with other public and private entities in treating and controlling noxious weeds on Forest Service-administered lands.

Under Alternative A, the rate of occurrences and spread of noxious weeds and the level and intensity of noxious weed treatment and control would not change. Integrated weed programs focus on treatment, control, and if possible, eradication of new and existing weed sites. Although these actions are not specific in protecting sensitive plant habitat, they may indiscriminately benefit sensitive plant species.

Three sensitive plant species under evaluation may be affected by the establishment and spread of invasive weeds. Uinta greenthread habitat is susceptible to cheatgrass invasion, especially populations along road ROWs (Heidel 2004). Heidel also noted the potential establishment of other invasive plants in its habitat from ground disturbances of ancillary developments associated with oil and gas exploration, such as pipelines and well pads.

Although not documented or specified, noxious weed invasion is listed as a potential threat for Logan buckwheat and Aquarius paintbrush (NatureServe 2013). Under Alternative A, cheatgrass invasion may impact populations of Uinta greenthread. New road construction and energy development in its habitat may lead to additional weed invasions. This may impact individual plants and populations, but it would not likely result in a loss of viability nor cause a trend toward federal listing. Other sensitive species under evaluation are not impacted by invasive weeds, and population trends would likely remain stable under this alternative.

Conifer Encroachment

Conifer encroachment into sagebrush ecosystems is common and widespread in the Intermountain West. Pinyon and juniper trees are known to encroach on sagebrush types in their thermal zones. Common sagebrush types are Wyoming sagebrush, black sagebrush, and occasionally mountain big sagebrush. Douglas-fir trees are known to encroach into high elevation sagebrush types. Unchecked by fire, conifers are capable of displacing shrubs and associated forbs and graminoids. Conifer encroachment in sagebrush and other shrub types could likely lead to the loss of individuals or populations of sensitive plants found in these affected shrub types.

National Forests have implemented and continue to implement vegetation treatments that curtail conifer encroachment into vegetation communities, including sagebrush. Treatments include prescribed fire, lop-and-scatter, and mechanical methods. These actions often coincide with Forest Service land use plans, which contain objectives to maintain, restore, or improve sagebrush and other valued plant communities. However, land use plans do not contain specific direction to control or limit conifer encroachment in sensitive plant habitat associated with sagebrush or other vulnerable vegetation communities. Under Alternative A, sensitive plant species and their habitat would not likely benefit from actions that curtail conifer encroachment, except from coincidental indiscriminate actions. There are no known impacts of conifer encroachment into habitat of sensitive plants under evaluation; therefore, conifer encroachment is not considered a cumulative effect.

Minerals and Energy

Ground disturbances from mineral and energy development, in all its forms, can result in loss and fragmentation of sensitive plant species habitat. Under Alternative A, most acres identified in the analysis areas are open to fluid mineral and nonenergy solid minerals leasing and development; however, approximately 138,500 acres are closed to fluid mineral leasing and nonenergy solid leasable minerals, 22,900 acres are classified as unsuitable for surface mining, 73,500 acres are closed to mineral materials disposal, and 498,700 acres are proposed for withdrawal from locatable mineral entry. Sensitive plants found in mineral and energy closure areas would not be affected under this alternative. Sensitive plant individuals and populations in open, leased, or unleased areas may be affected under Alternative A.

Two sensitive plant species under evaluation have mineral and energy extraction and exploration as a threat. Populations of Uinta greenthread are threatened by land disturbances associated with oil and gas exploration (Heidel 2004). Jouseau (2012) identified gravel quarrying as a threat to some populations of stemless beardtongue, but Goodrich (2013) documented the high capability of the plant to colonize in great abundance in old gravel quarries, in two-track roads, and on road cuts. Expansion of oil and gas exploration in Uinta greenthread habitat, coupled with potential new road construction, potential timber harvesting, and cheatgrass establishment and spread may impact individual plants and possibly populations. Mineral and energy extraction are not considered threats to the other sensitive species under evaluation. Population trends of these species would likely remain stable under this alternative.

Infrastructure

Roads, power lines, and other utility corridors and fences, buildings, and other man-made structures can contribute to the loss of individuals and populations and may fragment sensitive plant habitat. Under Alternative A, relatively few acres (approximately 94,800) in the analysis areas are excluded from new ROWs or are identified as avoidance areas. Sensitive plants found in ROW exclusion or avoidance areas would not likely be affected under this alternative. Sensitive plant individuals and populations in areas open to new ROWs may be affected under Alternative A. Roads are listed as a threat to all sensitive species under evaluation and may lead to a loss of individual plants. But this would not likely result in a loss of viability nor cause a trend toward federal listing. Other types of infrastructure may impact individuals or populations under evaluation and are found to be cumulative; these are the construction or expansion of communication towers, pipelines, and recreation buildings.

Livestock Grazing and Feral Horses

Livestock grazing under Alternative A would continue, with no expected change in AUMs, season of use, or other terms, conditions, or directives delineated in grazing permits or AMPs; however, administrative actions may occur on a case-by-case basis to attain desired rangeland conditions. These are usually incorporated into most land use plans, which also contain standards and guidelines designed to maintain healthy, sustainable rangeland resources and to restore degraded rangelands.

Impacts of livestock grazing on sensitive plants under evaluation are trampling and herbivory. These impacts can physically damage individuals, populations, and the habitat where they grow. Trampling and grazing can reduce plant growth, development, and sexual reproduction and can destroy individual plants. Impacts may lead to population decline of some sensitive plants.

The impacts of grazing and trampling on individuals, populations, and habitat quality depend on the palatability of the species, grazing and trampling tolerance, grazing intensity, and ungulate forage preferences.

Arizona willow is a palatable shrub and grows in meadows preferred and frequented by large ungulates. Maschinski (2001) found that wild and domestic browsing "significantly reduced above-ground biomass, height, survival, and sexual reproduction" of Arizona willow in Arizona, Utah, and New Mexico. Decker (2006) stated that with increasing elk numbers, coupled with sustained livestock use, overall grazing by ungulates may impact individuals and populations of Arizona willow. In areas where elk concentration is high, willow plants were found to be shorter and to have less in canopy cover. Decker concluded that the combined impact of domestic livestock and wildlife grazing on Arizona willow may be "beyond [the species] presumed tolerance."

The primary threat to Aquarius paintbrush is livestock grazing. Sheep and cattle grazing are known to extensively impact individuals and populations of the plant. On sheep allotments where Aquarius paintbrush is found and is browsed, it has been virtually eliminated (NatureServe 2013).

Heidel (2004) found that although intensive livestock grazing was originally identified as a threat to Uinta greenthread, it was inconclusive whether livestock or wildlife actually use the plant. Goodrich (2006) reported no evidence of grazing by sheep or cattle on Uinta greenthread. Little penstemon is known to grow in areas that have a history of intensive grazing. The impacts of grazing may likely impact individuals and populations of the plant, but population trend data is not known for this species. The impacts of grazing on Logan buckwheat is unknown and has not been listed as a threat.

Trampling is recognized as a threat to individuals and populations of some sensitive species. Although stemless beardtongue shows no evidence of being grazed by ungulates, negative impacts from trampling was observed, especially where cattle congregate (Jouseau 2012). Decker (2006) noted that trampling by large ungulates negatively impacted individual shrubs by inhibiting their growth and reproduction.

Under Alternative A, the impacts of grazing on Arizona willow, Aquarius paintbrush, little penstemon, and stemless beardtongue are considered cumulative. Grazing and trampling may continue to impact individual plants and populations of sensitive plants, especially Arizona willow and Aquarius paintbrush. Trends of sensitive plant populations under evaluation are expected to remain unchanged under this alternative.

Since there are no wild horse or burro management areas in PHMA on Forest Service-administered lands, Alternatives A, B, C, D, E, and F would not apply to feral horses.

7.3.2 Alternative B

Alternative B would place a 3 percent threshold on anthropogenic disturbance in PHMA, which would include all past, present, and future disturbances. The 3 percent threshold would reduce but not eliminate the potential for direct and indirect impacts described under Alternative A. Cumulative effects for Alternative B would be similar to those described for Alternative A, but the magnitude of cumulative effects would likely be less than Alternative A because of the 3 percent threshold in PHMA. In GHMA, activities would continue under current management. Sensitive plants in GHMA would likely experience direct, indirect, and cumulative effects similar to those described for Alternative A. Direct, indirect, and cumulative effects for Alternative B are further discussed under the seven headings below.

Recreation/Travel Management
Under this alternative there would be limited opportunities for road construction and improvement in PHMA, with minimum standards applied and no upgrading of current roads. GHMA would be designated as per the travel management plan in the current planning document. The habitat disturbance limitation of 3 percent would apply for new roads associated with valid existing rights. Routes would be evaluated for seasonal closure to reduce functional loss of sagebrush habitat and habitat degradation from routes in important habitats. In addition, recreation permits would be given in PHMA only if there were a neutral or beneficial impact on GRSG. No cross-country vehicle use would be permitted in PHMA. This is more restrictive than Alternative A, allowing fewer anthropogenic influences on sagebrush habitats by minimizing human use and road construction and upgrading.

The 3 percent threshold on anthropogenic disturbance found under Alternative B would reduce but not eliminate the potential direct and indirect impacts from travel management and recreational uses described under Alternative A. Conservation actions associated with this alternative could lessen impacts on sensitive plant individuals and populations that occur in PHMA. In GHMA, direct, indirect, and cumulative effects on sensitive plants would be similar under Alternatives A and B.

Fire

Under Alternative B, fuel treatments would use design criteria that would best protect existing sagebrush ecosystems found in PHMA. Fewer fuel treatments would occur or less GRSG habitat would be burned under Alternative B than Alternative A because of the new criteria. None of the design criteria are specific to sensitive plant species. Implementing the criteria would likely reduce but not eliminate direct and indirect effects on sensitive plants growing in sagebrush and other vegetation communities prone to burning or targeted for fuel treatments; however, impacts would likely be less than under Alternative A because of fewer acres burned.

Direct and indirect impacts on sensitive plant species found in GHMA would be similar to those described under Alternative A. In PHMA and GHMA, cumulative effects under Alternative B would be similar to those under Alternative A because fire and fuel treatments are not identified as anthropogenic disturbances and are not subject to the 3 percent threshold.

Spread of Weeds

The establishment and spread of invasive weeds would likely be reduced because of the 3 percent disturbance threshold described under Alternative B; however, the direct, indirect, and cumulative effects on sensitive plants would likely be similar to those described under Alternatives A because of existing anthropogenic disturbance and weed establishment. Also, integrated weed management actions to control noxious weeds described under Alternative A are the same for Alternative B.

Conifer Encroachment

The direct, indirect, and cumulative effects on sensitive plants from conifer encroachment would be similar under Alternatives A and B.

Minerals and Energy

In PHMA, lands not leased for either fluid minerals or nonenergy solid minerals would be closed from leasing under Alternative B. The number of acres found unsuitable for surface mining

would be significantly higher under Alternative B than under Alternative A. Also, locatable mineral recommended for withdrawal would be about 86 percent more under Alternative B than under Alternative A. Overall, these actions would considerably increase the number of acres closed to mineral lease and extraction not found under Alternative A. Ground disturbances associated with mineral extraction would be reduced, which would likely lessen but not eliminate direct, indirect, and cumulative effects on sensitive plant species found in PHMA. The 3 percent threshold on anthropogenic disturbance would likely further reduce potential impacts compared to Alternative A. Disturbance restrictions in this alternative could also benefit sensitive plant individuals and populations.

Under Alternative B, direct, indirect, and cumulative effects on sensitive plants in GHMA would be similar to those described for Alternative A.

Infrastructure

Compared to Alternative A, Alternative B considerably limits infrastructure construction in PHMA. Acres open to new ROWs decreased from 3,219,000 acres under Alternative A to 529,600 acres under Alternative B, an 84 percent reduction. Fewer disturbances associated with new roads and other infrastructure construction would likely reduce but not eliminate impacts on sensitive plants. The 3 percent threshold under Alternative B would further reduce impacts compared to Alternative A. The direct, indirect, and cumulative effects on sensitive plants would likely be less under Alternative B than under Alternative A.

Under Alternative B, direct, indirect, and cumulative effects on sensitive plants in GHMA would be similar to those described for Alternative A.

Livestock Grazing and Feral Horses

Alternative B would be similar to Alternative A in that there would be no change in the number of acres open to livestock grazing or reduction in AUMs. Alternative B; however, would incorporate GRSG habitat objectives and management considerations through permit renewals, AMPs, or annual operating instructions where current grazing management is not meeting GRSG habitat requirements in PHMA. Actions would be developed with specific objectives to conserve, enhance, or restore GRSG habitat and move rangelands in PHMA toward desired condition. Alternative B would likely reduce the direct and indirect impacts of grazing on sensitive plants in PHMA, especially those species that are grazed by livestock, such as Arizona willow or Aquarius paintbrush.

Under Alternative B, direct and indirect impacts on sensitive plants in GHMA would be similar to those described for Alternative A. Cumulative effects in PHMA and GHMA would likely be similar to Alternatives A.

7.3.3 Alternative C

Under Alternative C, all GRSG habitats would be managed as PHMA. This alternative is similar to Alternative B in that it would place a 3 percent threshold on anthropogenic disturbance in PHMA, which would include existing and all new disturbance to the landscape. Alternative C is different in that it limits surface disturbance to one instance per section and expands the definition of anthropogenic disturbances, which includes livestock grazing. Direct and indirect impacts on sensitive plants would likely be less under Alternative C than under Alternatives A and B due to its expanded definition of disturbance and its more restrictive components. Cumulative effects for Alternative C would be similar to those described for Alternatives A and B, but the magnitude of

cumulative effects would likely be less than the other alternatives because all GRSG habitat is managed as PHMA. Direct, indirect, and cumulative effects for Alternative C are further discussed under the seven headings below.

Recreation/Travel Management

Impacts to sensitive plants would be similar to those described under alternative B except in PHMA camping and other non-motorized recreation would be prohibited during certain seasons within 4 miles of a lek. In addition, there would be no new route construction within 4 miles of a lek. If any populations or habitats for sensitive plants are within 4 miles of a lek, there could be fewer impacts to the plants in comparison to alternatives A and B.

Fire

The fire policies and design criteria described under Alternative B would also be implemented under Alternative C, with an additional provision that would exclude livestock grazing in PHMA burned areas until they recover. Direct and indirect impacts on sensitive species growing in sagebrush and other vegetation communities prone to burning or targeted for fuel treatments would be similar to those described under Alternative B. Cumulative effects would be similar to those described under Alternative A.

Spread of Weeds

The establishment and spread of invasive weeds would likely be reduced because of the 3 percent disturbance threshold that would be applicable in all GRSG potential habitat. On the other hand, the direct, indirect, and cumulative effects on sensitive plants would be similar; however, the impact would be less under Alternatives A, B, and C because of existing anthropogenic disturbance and weed establishment. The integrated vegetation management protocol to control noxious weeds described under Alternative A is the same for Alternative C, with an additional provision that would develop and implement methods to prioritize and restore sagebrush steppe in PHMA invaded by nonnative plants.

Conifer Encroachment

The direct, indirect, and cumulative effects on sensitive plants from conifer encroachment would be similar under Alternatives A, B, and C.

Minerals and Energy

The policy provisions regarding mineral leasing and extraction under Alternative B would be the same for Alternative C, except the policies are applicable to all GRSG habitat, which would be managed as PHMA under Alternative C. Overall, these actions would considerably increase the number of acres closed to mineral lease and extraction not found under Alternatives A and B. Ground disturbances under this alternative would be less, but would not fully eliminate direct, indirect, and cumulative effects on sensitive plant species because of past disturbances. The 3 percent threshold on new anthropogenic disturbance would contribute to the reduction of potential impacts because it would also include designated GHMA not covered under the disturbance threshold under Alternative B. Disturbance restrictions in this alternative would likely benefit sensitive plant individuals and populations found in GRSG habitat.

Infrastructure

The policy changes regarding ROWs and new infrastructure construction under Alternative B are similar for Alternative C. The exception is the policies are applicable to all GRSG habitat, which is managed as PHMA under Alternative C. Under this alternative, all GRSG habitat would be excluded from new ROWs. Ground disturbances under Alternative C would be less but would not fully eliminate direct, indirect, and cumulative effects on sensitive plant species because of past and ongoing disturbances. The 3 percent threshold on anthropogenic disturbance would contribute to the reduction of potential impacts not found under Alternative A, but it also would expand to designated GHMA recognized but not covered under Alternative B. Disturbance restrictions under this alternative would likely benefit sensitive plant individuals and populations found in GRSG habitat.

Livestock Grazing and Feral Horses

Alternative C was separated into two alternatives in regards to livestock grazing and feral horses. The differences between Alternatives C1 and C2 are discussed below.

Alternative C1

Alternative C1 would exclude all classes of livestock grazing in PHMA, which would result in the reduction of up to 265,373 permitted AUMs on Forest Service-administered lands. Rangelands found in unsatisfactory condition from impacts of grazing could improve under this alternative. In PHMA, all direct and indirect impacts of current and future livestock grazing on sensitive plants would be eliminated, which would likely benefit sensitive plants, especially those species, such as Arizona willow or Aquarius paintbrush, that are grazed by livestock. Alternative C1's past and current impacts are similar for Alternatives A, B, and C2 and would be considered cumulative, but the elimination of livestock grazing would remove it as a future cumulative effect on sensitive plants.

Alternative C2

Under Alternative C2, AUMs would be reduced on livestock grazing allotments in PHMA. This would follow reviews at the Forest level that would modify grazing management to enhance or improve GRSG habitat and accommodate GRSG life cycle requirements. Management actions under this alternative would reduce AUMs from 265,373 under Alternatives A and B to 159,224 AUMs. Alternative C2 would likely reduce but not eliminate the direct and indirect impacts of grazing on sensitive plants in PHMA, especially those, such as Arizona willow or Aquarius paintbrush, that are grazed by livestock. Cumulative effects on PHMA would likely be similar to those described under Alternatives A and B, although the magnitude of those impacts would be less.

7.3.4 Alternative D

Alternative D would place a 5 percent threshold on anthropogenic disturbance in PHMA, which would include all past, present, and future disturbances. Restrictions would be associated with new anthropogenic disturbances that would favor GRSG habitat enhancement and accommodate GRSG life cycle requirements. The 5 percent threshold would reduce but not eliminate the potential direct and indirect impacts described under Alternative A because of past and ongoing disturbances. Cumulative effects for Alternative D would be similar to those described for Alternative A, but the magnitude of cumulative effects would likely be less than Alternative A because of the 5 percent threshold in PHMA. In GHMA, activities would continue under current

management. Sensitive plants in GHMA would likely experience direct and indirect impacts similar to those described for Alternative A. Direct, indirect, and cumulative effects for Alternative D are further discussed under the seven headings below.

Recreation/Travel Management

Impacts from recreational permits would be the same as those described for Alternative B because recreation permits would be given in PHMA only if there were a neutral or beneficial impact on GRSG. Impacts from other types of recreation, including recreation at developed recreation sites and dispersed recreation would be the same as those described under Alternative A.

Under this alternative, travel would be limited to existing or designated routes within all PHMA. PHMAs that currently do not have designated routes would be designated in a travel management plan as limited to existing routes. In those areas managed as limited to existing routes, impacts on travel and transportation management under Alternative D would be the same as Alternative B. It is possible that fewer new road constructions would be allowed due to the 5 percent threshold on anthropogenic disturbance compared to Alternative A, but perhaps not as much as Alternative B which has a 3 percent threshold. Conservation actions associated with this alternative could lessen impacts on sensitive plant individuals and populations that occur in PHMA. In GHMA, direct, indirect, and cumulative effects on sensitive plants would be similar to Alternative A.

Fire

Alternative D is similar to Alternative B, but it would also include fuel breaks to protect large areas of PHMA. It would implement fuels management policies in PHMA that would protect GRSG habitat, would accommodate GRSG life cycle needs, and would consider livestock grazing as a tool to reduce fuel loading. Because of the new criteria, fewer fuels treatments would occur in PHMA and less GRSG habitat would be burned under Alternative D than under Alternative A. None of the design criteria of this alternative are specific to sensitive plant species. The implementation of the criteria would reduce but not eliminate direct and indirect impacts on sensitive plant species growing in sagebrush or other vegetation communities prone to burning or targeted for fuel treatments. However, the impacts would likely be less than under Alternatives A and B because of fewer acres burned.

Direct and indirect impacts on sensitive plant species found in GHMA would be similar to those described under Alternatives A and B. In PHMA and GHMA, cumulative effects under Alternative D would be similar to those under Alternatives A and B because fire and fuel treatments are not identified as anthropogenic disturbances and are not subject to the 5 percent threshold.

Spread of Weeds

The direct, indirect, and cumulative effects on sensitive plants would be similar under Alternatives A, B, C, and D. The integrated vegetation management protocol to control noxious weeds described under Alternative A is the same for Alternative D. Alternative D is similar to Alternative C in that an additional provision would be developed. It would implement methods to prioritize and restore sagebrush steppe in PHMA invaded by nonnative plants. This places greater emphasis on habitat restoration in PHMA not found under Alternatives A or B. The additional provision could lessen impacts on sensitive plants.

Conifer Encroachment

Unlike Alternatives A, B, and C, Alternative D includes provisions that would specifically target conifer encroachment in PHMA to maintain and expand GRSG habitat. These provisions are not specific for sensitive plants. The direct, indirect, and cumulative effects on sensitive plants from conifer encroachment would be similar to Alternative A, except for sensitive plants that are located in PHMA that are specifically targeted with treatments that would maintain or expand GRSG habitat.

Minerals and Energy

Under Alternative D, lands in PHMA would be closed to new leasing of nonenergy leasable minerals and mineral material sales. This would considerably reduce new ground disturbances associated with surface mining and other surface mineral extractions. Coal leases, locatable mineral withdrawals, and areas not leased for fluid mineral leasing would be allowed or would remain open for leasing under this alternative; however, they would require government reviews to determine impacts on PHMA, and conservation measures or stipulations would be implemented to reduce or mitigate impacts.

Similar to Alternative A, Alternative D does not protect PHMA from potential impacts of coal leasing or locatable mineral withdrawals, but it does add restrictions to reduce or mitigate impacts and protect GRSG habitat and life cycle requirements. Under Alternative D, direct and indirect impacts on sensitive plants in PHMA where coal leasing, locatable mineral withdrawals, and fluid mineral leasing occurs would be similar to those described under Alternative A; however, impacts would likely be less due to additional conservation measures and stipulations.

Direct and indirect impacts on sensitive plants would be similar to those under Alternative B in PHMA that would be closed to nonenergy leasable minerals leasing and mineral material sales. Ground disturbances under this alternative would be less but would not eliminate direct and indirect impacts on sensitive plant species because of past and ongoing disturbances. The 5 percent threshold on anthropogenic disturbance would contribute to the reduction of potential impacts not found under Alternative A.

Alternative D adds specific conservation measures or stipulations to minerals and energy extraction to mitigate its impacts, to protect GRSG habitat, and to accommodate GRSG life cycle requirements in GHMA. Under Alternative D, direct and indirect cumulative effects on sensitive plants in GHMA would be similar to, but more protective than, those described for Alternative A.

Cumulative effects in PHMA and GHMA would likely be similar to Alternative A.

Infrastructure

Alternative D would include new avoidance and exclusion areas for specific infrastructure types in PHMA. It would include conservation measures or stipulations to reduce or mitigate impacts of new ROWs, to protect PHMA, and to accommodate GRSG life cycle requirements. Overall, Alternative D would protect PHMA from new ROW construction more than Alternative A because the additional conservation measures or stipulations would better protect PHMA and would buffer GRSG life cycles from new ROW impacts. Ground disturbances under Alternative D would be less than Alternative A; however, Alternative D would not eliminate direct, indirect, and cumulative effects on sensitive plant species because of past and ongoing disturbances. The 5 percent threshold on anthropogenic disturbance would contribute to the reduction of potential impacts not found under Alternative A.

Livestock Grazing and Feral Horses

Similar to Alternatives A and B, Alternative D would maintain AUMs under current management; however, it would provide direction to modify grazing management in order to meet PHMA objectives and would maintain, enhance, or improve desired GRSG habitat conditions. Modifications would occur at unit level and would be implemented through the permit renewal process or other appropriate actions.

In PHMA, the direct, indirect, and cumulative effects on sensitive plants under Alternative D would be similar to Alternative B. It would likely reduce the impacts of grazing on sensitive plants that would occur under Alternative A because of provisions designed to protect or enhance GRSG habitat.

Under Alternative D, direct and indirect impacts on sensitive plants in GHMA would be similar to those described for Alternative A. Cumulative effects in PHMA and GHMA would likely be similar to Alternative A, but the magnitude of the impacts could be less in PHMA because of provisions designed to protect or enhance GRSG habitat by improving grazing management.

7.3.5 Alternative E

Alternative E would place a 5 percent threshold on new anthropogenic disturbances in any particular State of Utah GRSG Management Area. Past and current disturbances would not count toward the 5 percent threshold. Conservation measures would be associated with new anthropogenic disturbances that would favor GRSG habitat and accommodate GRSG life cycle requirements. The 5 percent threshold would reduce but not eliminate the potential direct and indirect impacts on sensitive plants described under Alternative A. Additionally, with respect to fluid mineral development, Alternative E would not allow surface occupancy within 1 mile of an occupied lek (if visible to GRSG in the lek) in SGMA. Alternative E would be less protective than Alternatives B, C, and D.

Cumulative effects for Alternative E would be similar to those described for Alternative A, but the magnitude of cumulative effects would likely be less than Alternative A because of the 5 percent disturbance threshold. Direct, indirect, and cumulative effects for Alternative E are further discussed under the seven headings below.

Recreation/ Travel Management

Similar to Alternative D, the 5 percent threshold on new anthropogenic disturbance could reduce new road construction in comparison with Alternative A, but not as much as Alternative B which has a 3 percent threshold. Under this alternative, impacts to nesting and winter habitats would be decreased because routes would be limited in these areas. Areas of GRSG habitat in SGMAs/core areas with nesting and winter habitat that do not have designated routes in a Travel Management Plan would be designated as limited to existing routes. This would reduce cross-country access and resulting impacts to sensitive plants in those areas, but would occur across a smaller area than under Alternatives B or D. Outside of these areas, dispersed recreation and developed recreation sites would have impacts similar to Alternative A.

Fire

Unique features for fire under Alternative E are implementing a statewide fire agency agreement that would eliminate jurisdictional boundaries, which would enhance the response to unwanted fire ignitions in SGMA and core areas. Another feature is the use of fire-retardant vegetation to

buffer high quality GRSG habitat areas from catastrophic fire. Conservation measures, practices, and oversight would be implemented to protect vulnerable and desirable sagebrush habitat. Policies associated with this alternative would likely reduce the acres of sagebrush burned with wild or prescribed fire. The direct, indirect, and cumulative effects of fire on sensitive plants would likely be less under Alternative E than under Alternative A, especially those species that grow in fire-prone habitat.

Spread of Weeds

Alternative E would implement an aggressive response to new weed infestations in order to curtail or minimize their spread and would require a high priority response to infestations near sagebrush habitats. Unlike Alternative A, the invasive weed policy of Alternative E would focus treatment, control, and eradication on weed infestations that would threaten GRSG habitat. The direct, indirect, and cumulative effects on sensitive plants would likely be similar to those described under other alternatives, although integrated weed management was not discussed under Alternative E.

Conifer Encroachment

Alternative E would implement vegetation management actions that would curtail conifer encroachment to expand, create, or increase the carrying capacity of GRSG habitat. Direct, indirect, and cumulative impacts on sensitive plants from conifer encroachment would be similar to Alternative A. Although these actions are not specific in protecting sensitive plant habitat, they may indiscriminately benefit some sensitive plants.

Minerals and Energy

Alternative E is more protective than Alternative A. This is because there is a 1-mile NSO buffer around leks in SGMA, and the remainder of habitat in SGMA would be subject to CSU and timing stipulations for fluid mineral and nonenergy solid minerals leasing. Alternative E differs from Alternative A by implementing conservation measures, stipulations, and BMPs to limit or mitigate potential impacts to protect GRSG habitat and accommodate their life cycle requirements. Direct, indirect, and cumulative impacts on sensitive plants in SGMA would likely be less than those identified under Alternative A because of the additional provisions that implement conservation measures, stipulations, and BMPs. The 5 percent threshold on new anthropogenic disturbance could contribute to the reduction of impacts on sensitive plants not found under Alternative A.

Since GRSG habitat outside SGMA would not be managed for conservation of GRSG, the direct, indirect, and cumulative effects on sensitive plants under Alternative B would be similar to those described for Alternative A.

Infrastructure

Under Alternative E, habitat in SGMA would be designated as an avoidance area for new ROWs with the exceptions to accommodate some new infrastructure construction. This alternative would implement conservation measures, stipulations, and BMPs designed to limit or mitigate potential impacts on protect GRSG habitat and accommodate GRSG life cycle requirements. Direct, indirect, and cumulative impacts on sensitive plants in SGMA would likely be less than those identified under Alternative A because of additional provisions that implement conservation measures, stipulations, and BMPs. The 5 percent threshold on new anthropogenic disturbance would likely contribute to the reduction of potential impacts not found under Alternative A.

Since GRSG habitat outside SGMA would not be managed for conservation of GRSG, the direct, indirect, and cumulative effects on sensitive plants under Alternative E would be similar to those described for Alternative A.

Livestock Grazing and Feral Horses

Alternative E would continue to accommodate current AUMs for livestock grazing under current management. However, it would emphasize the use of BMPs to improve GRSG habitat and would seek consideration of conservation measures and stipulations designed to enhance or improve GRSG habitat and accommodate their life cycle requirements. Alternative E, also provides a mechanism to enhance or improve GRSG habitat in SGMA impacted by grazing by managing for stable or increasing populations. Direct, indirect, and cumulative impacts on sensitive plants in SGMA may likely be less than those identified under Alternative A because of the emphasis on BMPs, with additional conservation measures and stipulations not included under Alternative A.

Since habitat outside SGMA would not be managed to conserve GRSG, the direct, indirect, and cumulative effects on sensitive plants under Alternative E would be similar to those described for Alternative A.

7.3.6 The Proposed Plan

The Proposed Plan would place a 3 percent threshold on anthropogenic disturbance in PHMA, which would be calculated at two levels—the biologically significant unit and the individual project level. The 3 percent threshold would reduce but not eliminate the potential direct and indirect impacts described under Alternative A. The Proposed Plan is most similar to Alternative B, except that several conservation measures would apply to GHMA as well as PHMA. Travel construction would be limited in PHMA and GHMA. The Forest Service would retain and seek to acquire lands in PHMA and GHMA. Fire and Fuels activities would implement measures to protect GRSG habitat in PHMA and GHMA. Cumulative effects for the Proposed Plan would be similar to those described for Alternative A, but the magnitude of cumulative effects would likely be less than Alternative A, and similar to Alternative B, because of the 3 percent threshold in PHMA. Direct, indirect, and cumulative effects for the Proposed Plan are further discussed under the seven headings below.

Recreation/ Travel Management

The 3 percent threshold on anthropogenic disturbance found under the Proposed Plan would reduce but not eliminate the potential direct and indirect impacts described under Alternative A. Travel construction would be limited in PHMA and GHMA, and would therefore reduce the potential for impacts to sensitive plants and their habitats in a larger area. Due to more conservation measures being applied in GHMA, direct, indirect, and cumulative effects on sensitive plants would be less than those described for Alternatives A and B.

Fire

The Proposed Plan is similar to Alternative B, but design criteria for fire and fuels activities would apply to GHMA in addition to PHMA. Due to the greater area of applicability, benefits to GRSG habitats translate into greater overall benefits to sensitive plant populations and habitats. Implementing the criteria would reduce but not eliminate direct and indirect impacts on sensitive plant species growing in sagebrush or other vegetation communities prone to burning or targeted for fuel treatments. The impacts would likely be less than Alternatives A and B because of fewer

acres burned. For stemless beardtongue, fewer acres burned may not be beneficial because this species seems to prefer areas with past disturbance and is rarely found in well-developed Wyoming big sagebrush communities.

Spread of Weeds

The direct, indirect, and cumulative effects on sensitive plants would be similar under all alternatives. The integrated vegetation management protocol to control noxious weeds described under Alternative A is the same for this alternative. The Proposed Plan is similar to Alternatives C, D, and E in that an additional provision would be developed and methods would be implemented to prioritize and restore sagebrush steppe in PHMA invaded by nonnative plants. This places greater emphasis on habitat restoration in PHMA not found under Alternatives A or B. The additional provision could lessen impacts on sensitive plants.

Conifer Encroachment

Unlike Alternatives A, B, and C but similar to Alternative D, the Proposed Plan includes provisions that would specifically target conifer encroachment to maintain and expand GRSG habitat. These provisions are not specific for sensitive plants. The direct, indirect, and cumulative effects on sensitive plants from conifer encroachment would be similar to Alternative A, except for sensitive plants in targeted treatment areas.

Minerals and Energy

Under the Proposed Plan, lands in PHMA would be closed to new leasing of mineral material sales. New coal and fluid mineral leases would be allowed, but an NSO stipulation would apply in PHMA. Conservation measures to reduce or mitigate impacts on GRSG habitat in PHMA would apply to existing leases. This would considerably reduce new ground disturbances associated with surface mining and other surface mineral extractions compared to Alternative A. Ground disturbances under this alternative would be less but would not eliminate direct and indirect impacts on sensitive plant species because of past and ongoing disturbances. The 3 percent threshold on anthropogenic disturbance would contribute to the reduction of potential impacts, as compared to Alternative A.

As with Alternative D, the Proposed Plan adds specific conservation measures or stipulations to minerals and energy extraction to mitigate its impacts, to protect GRSG habitat, and to accommodate their life cycle requirements in GHMA. Under the Proposed Plan, direct and indirect cumulative effects on sensitive plants in GHMA would be similar to but more protective than those described for Alternative A. Cumulative effects on PHMA and GHMA would likely be similar to Alternative A.

Infrastructure

Under this alternative, new travel construction would be limited in PHMA and GHMA, similar to Alternative C in this regard. Alternatives B and D limit new travel construction only in PHMA. PHMA would be established as avoidance areas for linear ROWs, such as transmission lines, under the Proposed Plan. In addition, transmission lines would be excluded within 4 miles of GRSG leks; other surface ROWs would be excluded within 1 mile of GRSG leks.

Overall, ehe Proposed Plan, more than Alternative A, would protect PHMA and areas near GRSG leks from new ROW construction. This is because its additional conservation measures or stipulations would better protect these areas and buffer GRSG life cycles from new ROW

impacts. Ground disturbances under the Proposed Plan would be less than Alternative A, but it would not eliminate direct, indirect, and cumulative effects on sensitive plant species because of past and ongoing disturbances. Similar to Alternative B, the 3 percent threshold on anthropogenic disturbance would contribute to the reduction of potential impacts, as compared to Alternative A.

Livestock Grazing and Feral Horses

Similar to Alternatives A, B, and D, the Proposed Plan would maintain AUMs under current management, but would provide direction to modify grazing management in order to meet PHMA objectives and would maintain, enhance, or improve desired GRSG habitat conditions. Modifications would occur at the unit level and would be implemented through the permit renewal process or other appropriate actions. The Proposed Plan would also make SFA a priority for evaluating permit renewals. In addition, it includes restrictions of new permanent livestock facilities, fences, sheep bedding, and camps within 1.2 miles of occupied leks. In PHMA, the direct, indirect, and cumulative effects on sensitive plants under the Proposed Plan would be similar to Alternative B. It would likely reduce the impacts of grazing on sensitive plants that would occur under Alternative A because of provisions designed to protect or enhance GRSG habitat.

Under the Proposed Plan, direct and indirect impacts on sensitive plants in GHMA would be similar to those described for Alternative A, except where occupied leks are present. In these areas, additional restrictions or mitigations would apply for new permanent livestock facilities, fences, sheep bedding, and camps within 1.2 miles of any occupied leks. Cumulative effects in PHMA and GHMA would likely be similar to Alternative A. However, the magnitude of the impacts could be less in PHMA because of provisions designed to protect or enhance GRSG habitat by improving grazing management.

7.3.7 Cumulative Effects for Sagebrush-Associated Species

Additional discussion of cumulative effects analysis and conclusions for Vegetation (Including Noxious Weeds; Riparian and Wetlands) are provided in Chapter 5 of the FEIS, herein incorporated by reference (USDI Bureau of Land Management and USDA Forest Service. 2015. Utah Greater Sage-Grouse, Final Land Use Plan Amendment and Environmental Impact Statement). Conclusions presented in the FEIS are summarized below.

Cumulative Effects Conclusion Summary

Past, present and reasonably foreseeable future actions and conditions within the cumulative impact analysis area that have affected and will likely to continue to affect vegetation are vegetation and habitat management and improvement projects, noxious weed control, wildland fire management, livestock grazing management, wild horse and burro use, energy development, and travel management planning. Invasive plants can alter plant community structure and composition, productivity, nutrient cycling, and hydrology, and may competitively exclude native plant populations. Travel management planning is a mechanism used to designate and close routes and proactively balance the demands for motorized recreation and access with protection of sensitive resources. By planning at the landscape scale, the BLM and Forest Service would be able to retain large expanses of sagebrush and manage impacts on vegetation from motorized vehicles through route designations and closures.

8. SUMMARY OF IMPACTS

The authors of this biological assessment addressed the potential impacts of each alternative on sensitive species and their habitats that may be present in the analysis area in terms of the following resource areas: recreation/travel management, fire, invasive weeds, conifer encroachment, minerals and energy development, infrastructure, and livestock grazing/feral horses management. The main difference between the Alternative A, the no action alternative, and all of the action alternatives is that the later would put into place regulatory authority and direction to protect and conserve GRSG habitats and reduce the negative impacts of land management in the resource areas above.

Each of the action alternatives, to various degrees, is intended to protect and conserve GRSG individuals and habitat over the no action alternative in the Utah EIS planning area. Likewise, other SAS considered in this biological assessment may experience similar positive impacts related to protecting GRSG habitat, where there is overlap in range. Conversely, some negative impacts on these other species would result from shifting anthropogenic disturbances into other sagebrush communities not associated with GRSG.

Alternative A maintains existing decisions from the land and resource management plans for all Forests in Utah and for all other current management direction, all terrestrial and aquatic wildlife species and plant species. The type and magnitude of impacts on sensitive species would remain unchanged under Alternative A, and each would be treated separately by individual NEPA actions. Since disturbance thresholds, restrictions, directives, BMPs, reductions, and other provisions were built into Alternatives B, C, D, E, and the Proposed Plan to protect GRSG and its habitat, fewer impacts on sensitive species would likely occur and the magnitude of the impacts would likely be lessened.

Table 6 summarizes determinations of effect for Forest Service sensitive species addressed in this analysis.

Table 6 Determination of Impacts Summary

Species	Biological Determination[4]	Alternative	Applicable Fores[5]t
Mammals			
Wolverine *Gulo gulo (luscus)*	No impact	All	ANF, WCNF
Pygmy rabbit *Brachylagus idahoensis*	BI (MIIH)	All action alternatives	All
	MIIH	No action	All
Bighorn sheep *Ovis canadensis*	No impact	All	ANF, FNF, MLNF, UNF, WCNF
Spotted bat *Euderma maculatum*	No impact	All	All
Townsend's western big-eared bat *Corynorhinus townsendii*	No impact	All	All
Fisher *Martes pennanti*	No impact	All	UNF
Gray wolf *Canis lupus*	No impact	All	WCNF
Birds			
Bald eagle *Haliaeetus leucocephalus*	No impact	All	All
Boreal owl *Aegolius funereus*	No impact	All	ANF, WCNF
Flammulated owl *Otus flammeolus*	No impact	All	All
Great gray owl *Strix nebulosa*	No impact	All	ANF, WCNF
Greater sage-grouse *Centrocercus urophasianus*	BI	All action alternatives	All
	MIIH	No action	All
Columbian sharp-tailed grouse *Tympanuchus phasianellus columbianus*	BI (MIIH)	All action alts	WCNF
	MIIH	No action	WCNF
Northern goshawk *Accipiter gentilis*	No impact	All	All

[4]BI = Beneficial impact; MIIH = May impact individuals or habitat, but would not likely contribute to a trend toward federal listing or cause a loss of viability to the population or species; (MIIH) = MIIH for areas outside of GRSG habitat

[5]ANF = Ashley National Forest; DNF = Dixie National Forest; FNF = Fishlake National Forest; MLNF = Manti-La Sal National Forest; UNF = Uinta National Forest; WCNF = Wasatch-Cache National Forest

Species	Biological Determination[4]	Alternative	Applicable Fores[5]t
Peregrine falcon *Falco peregrinus anatum*	No impact	All	All
Three-toed woodpecker *Picoides tridactylus*	No impact	All	All
Amphibians			
Columbia spotted frog *Rana luteiventris*	BI (MIIH)	Action alternatives	ANF, MLNF, UNF, WCNF
	MIIH	No action	ANF, MLNF, UNF, WCNF
Boreal Toad *Anaxyrus boreas boreas*	BI (MIIH)	Action alts	All
	MIIH	No action	All
Fish			
Bonneville cutthroat trout *Oncorhynchus clarkii utah*	No impact	All	All
Colorado River cutthroat trout *O. c. pleuriticus*	No impact	All	All
Southern leatherside chub *Lepidomeda aliciae*	No impact	All	DNF, FNF, MLNF, UNF
Northern leatherside chub *L. copei*	No impact	All	WCNF
Plants			
Aquarius paintbrush *Castilleja aquariensis*	MIIH	All	DNF
Logan buckwheat *Eriogonum loganum*	MIIH	All	WCNF
Stemless beardtongue *Penstemon acaulis*	MIIH	All	ANF
Little penstemon *P. parvus*	MIIH	All	DNF, FNF
Arizona willow *Salix arizonica*	MIIH	All	DNF, FNF, MLNF
Uinta greenthread *Thelesperma pubescens*	MIIH	All	WCNF

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